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Frederick John Butler

THE
COLLECTED WORKS
OF
SIR HUMPHRY DAVY, BART.

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COLLECTED WORKS

OF

SIR HUMPHRY DAVY, BART.

LL.D. F.R.S.

FOREIGN ASSOCIATE OF THE INSTITUTE OF FRANCE, ETC.

EDITED BY HIS BROTHER,

JOHN DAVY, M.D. F.R.S.

VOL. IX.

SALMONIA;

AND

CONSOLATION IN TRAVEL.

LONDON:

SMITH, ELDER AND CO. CORNHILL.

1840.



LONDON:

PRINTED BY STEWART AND MURRAY, OLD BAILEY.

SALMONIA,
OR
DAYS OF FLY-FISHING;
IN
A SERIES OF CONVERSATIONS:
WITH
SOME ACCOUNT OF THE HABITS OF FISHES
BELONGING TO THE GENUS SALMO.

CONSOLATION IN TRAVEL,
OR
THE LAST DAYS OF A PHILOSOPHER.

LONDON:
SMITH, ELDER AND CO. CORNHILL.
1840.

[This concluding Volume of the Author's Collected Works, contains his last productions, "Salmonia, or Days of Fly-fishing," and "Consolation in Travel, or the Last Days of a Philosopher;" the former published shortly before his death, the latter after that event.

In the Advertisement to each, the valetudinary circumstances under which they were written, are briefly noticed, and in the Memoir of his Life, they are fully detailed.

Both these little works, the productions, not of his idle but of his languid hours, have been highly praised, and by good fortune, by two of the best judges and ablest men—the late Sir Walter Scott and Baron Cuvier.

Sir Walter Scott, in his charming critique on *Salmonia*, which appeared in the *Quarterly Review* shortly after the publication of the first edition, notices it as an illustration of the Scripture impression "that the gleanings of the grapes of Ephraim are better than the vintage of Abiezer," having previously remarked, that these fruits of the Author's "languid hours, in which lassitude succeeds to pain, are more interesting and instructive than the exertion of the talents of others, whose minds and bodies are in the fullest vigour."

And Baron Cuvier, in his *éloge* of the Author, as a foreign member of the Institute, commenting on these writings, remarks on "*Salmonia*," that the curious observations which it contains relative to the natural history of the trout and salmon "will render it always of importance in the science of ichthyology;" and speaking of the "*Consolation in Travel*," he observes, "that once escaped from the laboratory, he had resumed the tranquil reveries and sublime thoughts which had formed the delight of his youth: it was in some measure the work of a dying Plato."

In this edition "the Consolation in Travel" is given precisely as in the first ; but, with the addition of a fragment of a Dialogue on the Chemical Elements, written, it is believed, about the same time as that entitled "the Chemical Philosopher," (forming a part of the work,) and of which it was at first designed to be a continuation.

In editing *Salmonia*, the opportunity has been taken to introduce some alterations made either from the dictation of the Author, who examined the second edition during his last illness, or in conformity with wishes which he then expressed.]

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SALMONIA:
OR
DAYS OF FLY FISHING.
IN
A SERIES OF CONVERSATIONS.
WITH
SOME ACCOUNT OF THE HABITS OF FISHES
BELONGING TO THE GENUS SALMO.

"Equidem credo quia sit divinitus illis
Ingenium,"

TO
WILLIAM BABINGTON, M.D. F.R.S.

THESE CONVERSATIONS ARE DEDICATED,
IN REMEMBRANCE
OF SOME DELIGHTFUL DAYS PASSED IN HIS
SOCIETY,
AND IN GRATITUDE
FOR AN UNINTERRUPTED FRIENDSHIP OF
A QUARTER OF A CENTURY.

P R E F A C E.

THESE pages formed the occupation of the Author during some months of severe and dangerous illness, when he was wholly incapable of attending to more useful studies, or of following more serious pursuits.* They constituted his amusement in many hours, which otherwise would have been unoccupied and tedious; and they are published in the hope that they may possess an interest for those persons who derive pleasure from the simplest and most attainable kind of rural sports, and who practise the art, or patronize the objects of contemplation, of the Philosophical Angler.

The conversational manner and discursive style were chosen as best suited to the state of health of the Author, who was incapable of considerable efforts and long-continued attention; and he could not but have in mind a model, which has fully proved the utility and popularity of this method of treating the subject—*The Complete Angler*, by Walton and Cotton.

The characters chosen to support these Conversations, are—HALIEUS, who is supposed to be an accomplished fly fisher; ORNITHER, who is to be regarded as a gentleman generally fond of the sports of the field,

* [During the winter of 1827-8: a considerable portion of *Salmonia* was written in the country, under the roof of his esteemed and attached friend, the late Mr. Poole, as noticed in this gentleman's interesting account of the Author in the 1st Vol.]

though not a finished master of the art of angling; POIETES, who is to be considered as an enthusiastic lover of nature, and partially acquainted with the mysteries of fly fishing; and PHYSICUS, who is described uninitiated as an angler, but as a person fond of inquiries in natural history and philosophy.

These personages are, of course, imaginary, though the sentiments attributed to them, the Author may sometimes have gained from recollections of real conversations with friends, from whose society much of the happiness of his early life has been derived; and, in the portrait of the character of HALIEUS, given in the last dialogue, a likeness, he thinks, will not fail to be recognized to that of the character of a most estimable Physician, ardently beloved by his friends, and esteemed and venerated by the public.*

He has limited his description of fish to the varieties of the *Salmo*, most usual in the fresh waters of Europe, and which may be defined as a genus having eight fins, the one above the tail fleshy, and without spines.

It is to be hoped M. Cuvier's new work on fishes will supply accurate information on this genus, which is still very imperfectly known.

Laybach, Illyria,
Sept. 30, 1828.

With respect to this second edition of *Salmonia*, the Author has nothing to observe, except that he has enlarged it by a considerable portion of new matter, which, he trusts, will not render it less acceptable to the public.

* [The late Dr. Babington; vide Vol. I. p. 326, for a brief notice of this excellent man.]

SALMONIA :

OR,

DAYS OF FLY FISHING.

FIRST DAY.

HALIEUS—POIETES—PHYSICUS—ORNITHER.

INTRODUCTORY CONVERSATION — SYMPOSIAC.

Scene, London.

PHYS.—HALIEUS, I dare say you know where this excellent trout was caught : I never ate a better fish of the kind.

HAL.—I ought to know, as it was this morning in the waters of the Wandle, not ten miles from the place where we sit, and it is through my means that you see it at table.

PHYS.—Of your own catching ?

HAL.—Yes, with the artificial fly.

PHYS.—I admire the fish, but I cannot admire the art by which it was taken ; and I wonder how a man of your active mind and enthusiastic character, can enjoy what appears to me a stupid and melancholy occupation.

HAL.—I might as well wonder, in my turn, that a man of your discursive imagination and disposition to

contemplation, should not admire this occupation, and that you should venture to call it either stupid or melancholy.

PHYS.—I have at least the authority of a great moralist, Johnson, for its folly.

HAL.—I will allow no man, however great a philosopher or moralist, to abuse an occupation he has not tried; and, as well as I remember, this same illustrious person praised the book and the character of the great Patriarch of Anglers, Isaac Walton.

PHYS.—There is another celebrated man, however, who has abused this, your patriarch, Lord Byron; and that in terms not very qualified. He calls him, as well as I can recollect, “A quaint old cruel coxcomb.”* I must say, a practice of this great fisherman, where he recommends you to pass the hook through the body of a frog with care, as though you loved him, in order to keep him alive longer, cannot but be considered as cruel.

HAL.—I do not justify either the expression or the practice of Walton, in this instance; but remember, *I* fish only with inanimate baits, or imitations of them, and I will not exhume or expose the ashes of the dead, nor vindicate the memory of Walton, at the expense of Byron, who, like Johnson, was no fisherman: but the moral and religious habits of Walton, his simplicity of manners, and his well-spent life, exonerate him from the charge of cruelty; and the book of a coxcomb would

* From Don Juan, Canto xii. Stanza 106.

“And Angling, too, that solitary vice,
Whatever Isaac Walton sings or says:
The quaint old cruel coxcomb in his gullet
Should have a hook and a small trout to pull it.”

not have been so great a favourite with most persons of refined taste. A noble lady, long distinguished at court for pre-eminent beauty and grace, and whose mind possesses undying charms, has written some lines in my copy of Walton, which, if you will allow me, I will repeat to you.

Albeit, gentle Angler, I
 Delight not in thy trade,
 Yet in thy pages there doth lie
 So much of quaint simplicity,
 So much of mind,
 Of such good kind,
 That none need be afraid,
 Caught by thy cunning bait, this book,
 To be ensnared on thy hook.

Gladly from thee, I'm lured to bear
 With things that seem'd most vile before,
 For thou didst on poor subjects rear
 Matter the wisest sage might hear.
 And with a grace,
 That doth efface
 More labour'd works, thy simple lore
 Can teach us that thy skilful *lines*,
 More than the scaly brood *confines*.

Our hearts and senses, too, we see,
 Rise quickly at thy master hand,
 And, ready to be caught by thee,
 Are lured to virtue willingly.
 Content and peace,
 With health and ease,
 Walk by thy side. At thy command
 We bid adieu to worldly care,
 And joy in gifts that all may share.

Gladly, with thee, I pace along,
 And of sweet fancies dream ;
 Waiting till some inspired song,
 Within my memory cherish'd long,

Comes fairer forth,
 With more of worth ;
 Because that time upon its stream
 Feathers and chaff will bear away,
 But give to gems a brighter ray.

C. C. 1812.

And though the charming and intellectual author of this poem is not an angler herself, yet I can quote the example of her lovely daughters, to vindicate fly fishing from the charge of cruelty, and to prove that the most delicate and refined minds can take pleasure in this innocent amusement. One of these young ladies, I am told, is a most accomplished and skilful salmon fisher. And if you require a poetical authority against that of Lord Byron, I mention the philosophical poet of the lakes, and the author of

“An Orphic tale, indeed,
 A tale divine, of high and passionate thoughts,
 To their own music chanted ;”*

who is a lover both of fly fishing and fly fishermen. Gay’s poem, you know, and his passionate fondness for the amusement, which was his principal occupation in the summer at Amesbury; and the late excellent John Tobin, author of the *Honey Moon*, was an ardent angler.

PHYS.—I am satisfied with your poetical authorities.

HAL.—Nay, I can find authorities of all kinds, statesmen, heroes, and philosophers; I can go back to Trajan, who was fond of angling. Nelson was a good fly fisher,† and as a proof of his passion for it, continued the pur-

* *The Friend*, p. 303, by S. T. Coleridge.

† I have known a person who fished with him at Merton, in the Wandle. I hope this circumstance will be mentioned in the next edition of that most exquisite and touching *Life of our Hero*, by the Laureate, an immortal monument raised by Genius to Valour.

suit even with his left hand. Dr. Paley was ardently attached to this amusement ; so much so, that when the Bishop of Durham inquired of him when one of his most important works would be finished, he said, with great simplicity and good humour, “ My Lord, I shall work steadily at it when the fly fishing season is over,” as if this were a business of his life. And I am rather reserved in introducing living characters, or I could give a list of the highest names of Britain, belonging to modern times, in science, letters, arts, and arms, who are ornaments of this fraternity,—to use the expression borrowed from the freemasonry of our forefathers.

PHYS.—I do not find much difficulty in understanding why warriors, and even statesmen, fishers of men, many of whom I have known particularly fond of hunting and shooting, should likewise be attached to angling ; but I own I am at a loss to find reasons for a love of this pursuit amongst philosophers and poets.

HAL.—The search after food is an instinct belonging to our nature ; and from the savage, in his rudest and most primitive state, who destroys a piece of game, or a fish, with a club or spear, to man in the most cultivated state of society, who employs artifice, machinery, and the resources of various other animals, to secure his object, the origin of the pleasure is similar, and its object the same : but that kind of it requiring most art, may be said to characterize man in his highest or intellectual state ; and the fisher for salmon and trout with the fly, employs not only machinery to assist his physical powers, but applies sagacity to conquer difficulties ; and the pleasure derived from ingenious resources and devices, as well as from active pursuit, belongs to this amusement. Then, as to its philosophical tendency,—it is a pursuit of moral discipline, requiring patience,

forbearance, and command of temper. As connected with natural science, it may be vaunted as demanding a knowledge of the habits of a considerable tribe of created beings—fishes, and the animals that they prey upon,—and an acquaintance with the signs and tokens of the weather and its changes, the nature of waters, and of the atmosphere. As to its poetical relations, it carries us into the most wild and beautiful scenery of nature ; amongst the mountain lakes, and the clear and lovely streams that gush from the higher ranges of elevated hills, or that make their way through the cavities of calcareous strata. How delightful in the early spring, after the dull and tedious time of winter, when the frosts disappear, and the sunshine warms the earth and waters, to wander forth by some clear stream, to see the leaf bursting from the purple bud, to scent the odours of the bank perfumed by the violet, and enamelled, as it were, with the primrose and the daisy ; to wander upon the fresh turf below the shade of trees, whose bright blossoms are filled with the music of the bee ; and on the surface of the waters to view the gaudy flies sparkling like animated gems in the sunbeams, whilst the bright and beautiful trout is watching them from below ; to hear the twittering of the water-birds, who, alarmed at your approach, rapidly hide themselves beneath the flowers and leaves of the water-lily ; and as the season advances, to find all these objects changed for others of the same kind, but better and brighter, till the swallow and the trout contend, as it were, for the gaudy May fly, and till, in pursuing your amusement in the calm and balmy evening, you are serenaded by the songs of the cheerful thrush and melodious nightingale, performing the offices of paternal love, in thickets ornamented with the rose and woodbine.

PHYS.—All these enjoyments might be obtained, without the necessity of torturing and destroying an unfortunate animal, that the true lover of nature would wish to see happy in a scene of loveliness.

HAL.—If all men were Pythagoreans, and professed the Brahmin's creed, it would, undoubtedly, be cruel to destroy any form of animated life ; but if fish are to be eaten, I see no more harm in capturing them by skill and ingenuity with an artificial fly, than in pulling them out of the water by main force with the net ; and in general, when taken by the common fishermen, fish are permitted to die slowly, and to suffer in the air, from the want of their natural element ; whereas, every good angler, as soon as his fish is landed, either destroys his life immediately, if he is wanted for food, or returns him into the water.

PHYS.—But do you think nothing of the torture of the hook, and the fear of capture, and the misery of struggling against the powerful rod ?

HAL.—I have already admitted the danger of analysing, too closely, the moral character of any of our field sports ; yet I think it cannot be doubted that the nervous system of fish, and cold-blooded animals in general, is less sensitive than that of warm-blooded animals. The hook usually is fixed in the cartilaginous part of the mouth, where there are no nerves ; and a proof that the sufferings of a hooked fish cannot be great, is found in the circumstance that, though a trout has been hooked and played for some minutes, he will often, after his escape with the artificial fly in his mouth, take the natural fly, and feed as if nothing had happened ; having apparently learned only from the experiment, that the artificial fly is not proper food. And I have caught pikes with four or five hooks in their

mouths, and tackle which they had broken only a few minutes before ; and the hooks seemed to have had no other effect, than that of serving as a sort of *sauce piquante*, urging them to seize another morsel of the same kind.

PHYS.—Fishes are mute, and cannot plead, even in the way that birds and quadrupeds do, their own cause ; yet the instances you quote, only prove the intense character of their appetites, which seem not so moderate as Whiston imagined, in his strange philosophical romance on the Deluge ; in which he supposes in the antediluvian world the heat was much greater than in this ; and that all terrestrial and aërial animals had their passions so exalted by this high temperature, that they were lost in sin, and destroyed for their crimes ; but that fish, living in a cooler element, were more correct in their lives, and were therefore spared from the destruction of the primitive world. You have proved, by your examples, the intensity of the appetite of hunger in fishes ; Spalanzani has given us proofs of the extraordinary manner in which a cold-blooded animal, that has most of the habits of the genus—the frog—persists in some of its actions, under the impulse of the appetites, though a limb, or even his head, is separated from the body.

HAL.—This is likewise in favour of my argument, that the sensibility of this class of animals to physical pain, is comparatively small.

PHYS.—The advocates for a favourite pursuit never want sophisms to defend it. I have even heard it asserted, that a hare enjoys being hunted. Yet I will allow that fly-fishing, after your vindication, appears amongst the least cruel of field-sports ;—I can go no farther ; as I have never thought of trying it, I can say

nothing of its agreeableness as an amusement, compared with hunting and shooting.

HAL.—I wish that you would allow me to convince you that, for a contemplative man, as you are, and a lover of nature, it is far superior, more tranquil, more philosophical, and, after the period of early youth, more fitted for a moderately active body and mind, requiring less violent exertion; and, pursued with discretion, affording an exercise conducive to health. There is a river, only a few miles off, where I am sure I could obtain permission for you, and our friend Poietes, to fish.

PHYS.—I am open to conviction on all subjects, and have no objection to spend one May-day with you in this idle occupation; premising that you take at least one other companion, who really loves fishing.

HAL.—You, who are so fond of natural history, even should you not be amused by fishing, will, I am sure, find objects of interest on the banks of the river.

PHYS.—I fear I am not entomologist enough to follow the life of the May-fly, but I shall willingly have my attention directed to its habits. Indeed, I have often regretted that sportsmen were not fonder of zoology; they have so many opportunities, which other persons do not possess, of illustrating the origin and qualities of some of the most curious forms of animated nature; the causes and character of the migrations of animals; their relations to each other, and their place and order in the general scheme of the universe. It has always appeared to me, that the two great sources of change of place of animals, were the providing of food for themselves, and resting-places and food for their young.* The great

* [A fact relative to the snipe may be mentioned, which is in accordance with this view. The snipe is very abundant in Ceylon,—and, there is reason to believe, it never leaves the island, but passes from one side of

supposed migrations of herrings from the poles to the temperate zone, have appeared to me to be only the approach of successive shoals from deep to shallow water, for the purpose of spawning. The migrations of salmon and trout, are evidently for the purpose of depositing their ova, or of finding food after they have spawned. Swallows and bee-eaters decidedly pursue flies over half the globe; the scolopax or snipe tribe, in like manner, search for worms and larvæ—flying from those countries where either frost or dryness prevents them from boring—making generally small flights at a time, and resting on their travels where they find food. And a journey from England to Africa is no more for an animal that can fly, with the wind, one hundred miles in an hour, than a journey for a Londoner to his seat in a distant province. And the migrations of smaller fishes or birds always occasion the migration of larger ones, that prey on them. Thus, the seal follows the salmon, in summer, to the mouths of rivers; the hake follows the herring and pilchard; hawks are seen in large numbers, in the month of May, coming into the east of Europe, after quails and land-rails; and locusts are followed by numerous birds, that, fortunately for the agriculturist, make them their prey.

HAL.—It is not possible to follow the amusement of angling, without having your attention often directed to the modes of life of fishes, insects, and birds, and many curious and interesting facts, as it were, forced upon your observation. I consider you (*Physicus*) as pledged to make one of our fishing party; and I hope, in a few

the island to the other, with the change of Monsoon; the rainy season prevailing on one side of the central mountains, whilst the season of drought prevails on the other side,—so that this bird, merely by crossing the mountains, can always find moisture and suitable food.]

days, to give you an invitation to meet a few worthy friends on the banks of the Colne. And you (*Poietes*) who, I know, are an initiated disciple of Walton's school, will, I trust, join us. We will endeavour to secure a fine day; two hours, in a light carriage with good horses, will carry us to our ground; and I think I can promise you green meadows, shady trees, the song of the nightingale, and a full and clear river.

POIET.—This last is, in my opinion, the most poetical object in nature. I will not fail to obey your summons. Pliny has, as well as I recollect, compared a river to human life. I have never read the passage in his works; but I have been a hundred times struck with the analogy, particularly amidst mountain scenery. The river, small and clear in its origin, gushes forth from rocks, falls into deep glens, and wantons and meanders through a wild and picturesque country, nourishing only the uncultivated tree or flower by its dew or spray. In this, its state of infancy and youth, it may be compared to the human mind in which fancy and strength of imagination are predominant—it is more beautiful than useful. When the different rills or torrents join, and descend into the plain, it becomes slow and stately in its motions; it is applied to move machinery, to irrigate meadows, and to bear upon its bosom the stately barge;—in this mature state, it is deep, strong, and useful. As it flows on towards the sea, it loses its force and its motion, and at last, as it were, becomes lost, and mingled with the mighty abyss of waters.

HAL.—One might pursue the metaphor still further, and say, that in its origin—its thundering and foam, when it carries down clay from the bank, and becomes impure, it resembles the youthful mind, affected by dangerous passions. And the influence of a lake in calming

and clearing the turbid water, may be compared to the effect of reason in more mature life, when the tranquil, deep, cool, and unimpassioned mind is freed from its fever, its troubles, bubbles, noise and foam. And, above all, the sources of a river—which may be considered as belonging to the atmosphere—and its termination in the ocean may be regarded as imaging the divine origin of the human mind, and its being ultimately returned to, and lost in, the Infinite and Eternal Intelligence from which it originally sprung.

SECOND DAY.

HALIEUS—POIETES—ORNITHER—PHYSICUS.

TROUT FISHING, DENHAM.—MAY, 1810.

Morning.

HAL.—I AM delighted to see you, my worthy friends, on the banks of the Colne; and am happy to be able to say, that my excellent host has not only made you free of the river for this day's angling, but insists upon your dining with him,—wishes you to try the evening fishing, and the fishing to-morrow morning,—and proposes to you, in short, to give up twenty-four hours to the delights of an angler's May-day.

POIET.—We are deeply indebted to him; and I hardly know how we can accept his offer, without laying ourselves under too great an obligation.

HAL.—Fear not: he is as noble-minded a man as ever delighted in good offices; and so benevolent, that I am sure he will be almost as happy in knowing you

are amused, as you can be in your sport ; and he hopes for an additional satisfaction in the pleasure of your conversation.

POIET.—So let it be.

HAL.—I will take you to the house ; you shall make your bow, and then you will be all free to follow your own fancies. Remember, the dinner hour is five ; the dressing bell rings at half-past four ; be punctual to this engagement, from which you will be free at seven.

POIET.—This is really a very charming villa scene, I may almost say a pastoral scene. The meadows have the verdure which even the Londoners enjoy as a peculiar feature of the English landscape. The river is clear, and has all the beauties of a trout stream of the larger size,—there rapid, and here still, and there tumbling in foam and fury over abrupt dams upon clean gravel, as if pursuing a natural course. And that island with its poplars and willows, and the flies making it their summer paradise, and its little fishing-house, are all in character ; if not extremely picturesque, it is at least a very pleasant scene, from its verdure and pure waters, for the lovers of our innocent amusement.

HAL.—It is ten o'clock ; you may put up your rods, or take rods from the hall : for so hospitable is the master of this mansion, that every thing is supplied to our hands. And Physicus, as you are the only one of our party ignorant of the art of fly fishing, I will fit you with a rod and flies ; and let me advise you to begin with a line shorter than your rod, and throw at first slowly and without effort, and imitate us as well as you can. As for precepts they are of little value ; practice and imitation will make you an angler.

POIET.—I shall put together my rod, and fish with

my own flies. It may be fancy, but I always think I do best with tackle with which I am used to fish.

HAL.—You are right; for fancy is always something: and when we believe that we can do things better in a particular way, we really do, by the influence of imagination, perform them both better and with less effort. I agree with moralists, that the standard of virtue should be placed higher than any one can reach; for in trying to rise, man will attain a more excellent state of being than if no effort were made. But to our business. As far as the perfection of the material for the angler is concerned, the flies you find on this table are as good as can be made, and for this season of the year, there is no great variety on this river. We have had lately some warm days, and though it is but the 18th of May, yet I know that the May-fly has been out for three or four days, and this is the best period of this destructive season for the fisherman. There are, I observe, many male flies on the high trees, and some females on the alders.

PHYS.—But I see flies already on the water, which seem of various colours,—brown and gray, and some very pale,—and the trout appear to rise at them eagerly.

HAL.—The fly you see is called by fishermen the alder fly, and appears generally in large quantities before the May-fly. Imitations of this fly, and of the green and the gray drake of different shades, are the only ones you will need this morning, though I doubt if the last can be much used, as the gray drake is not yet on the water in any quantity.

PHYS.—Pray can you give us any account of these curious little animals?

HAL.—We ought to draw upon your stores of science for information on these subjects.

PHYS.—I really know nothing of Entomology, but I am desirous of acquiring knowledge.

HAL.—I have made few observations on flies as a philosophical naturalist. What I know I will state at another time. But see, the green drake is descending upon the water, and some are leaving the alders to sport in the sunshine, and to enjoy the pleasures of their brilliant, though short existence; and their life, naturally ephemeral, is made one of scarcely a moment, by the fishes and birds: that which the swallow or the duck spares is caught by the fish. The fly is new, and in the imitation, I recommend the olive tint, or what the Irish call the green monkey; that is, an artificial fly, with a wing of dyed yellow drake's feather, a body of yellow monkey's fur, and a small quantity of olive mohair for legs. For myself, I shall fish for some time with a large red alder fly, and I dare say with as much success; that is, with a fly with a dark peacock's harle for body, a red hackle for legs, and wings of the land-rail below, and starling above.

POIET.—The water is quite in motion: what noble fish I see on the feed! I never beheld a finer sight, though I have often seen the May-fly on well-stocked waters.

HAL.—This river is most strictly preserved; not a fish has been killed here since last August, and this is the moment when the large fish come to the surface, and leave their cad bait search and minnow hunting. But I have hardly time to talk; I have hold of a good fish: they take either alder or May-fly, and having never been fished for this year, they make no distinction, and greedily seize any small object in motion on the water. You see the alder-fly is quite as successful as the May-fly; but there is a fish which has re-

fused it, and because he has been feeding, glutton-like, on the May-fly ; that is the fifth he has swallowed in a minute. Now I shall throw the drake a foot above him. It floats down, and he has taken it. A fine fish ; I think at least 4 lbs. This is the largest fish we have yet seen, but in the deep water still lower down, there are still greater fish. One of 5 lbs., I have known taken here, and once a fish a little short only of 6 lbs.

POIET.—I have just landed a fish which I suppose you will consider as a small one ; yet I am tempted to kill him.

HAL.—He is not a fish to kill, throw him back, he is much under 2 lbs., and, as I ought to have told you before, we are not allowed to kill any fish of less size ; and I am sure we shall all have more than we ought to carry away even of this size. Pray put him into the well, or rather give him to the fisherman to turn back into the water.

POIET.—I cannot say I approve of this manner of fishing : I lose my labour.

HAL.—As the object of your fishing, I hope, is innocent amusement, you can enjoy this, and show your skill in catching the animal ; and if every fish that took the May-fly were to be killed, there would be an end to the sport in the river, for none would remain for next year.

PHYS.—The number of flies seems to increase as the day advances, and I never saw a more animated water scene : all nature seems alive ; even the water-wagtails have joined the attack upon these helpless and lovely creations from the waters.

HAL.—It is now one o'clock ; and between twelve and three is the time when the May-fly rises with most vigour. It is a very warm day, and with such a quan-

tity of fly, every fish in the river will probably be soon feeding. See, below the weir, there are two or three large trout lately come out; and from the quiet way in which they swallow their prey, and from the size of the tranquil undulation that follows their rise, I suspect they are the giants of this river. Try if you cannot reach them; one is near the bank in a convenient place for a throw, for the water is sufficiently rough to hide the deception, and these large fish do not take the fly well in calm water, though with natural flies on the hook they might all be raised.

POIET.—I have him! Alas! he has broken me, and carried away half my bottom line. He must have been a fish of 7 or 8 lbs. What a dash he made! He carried off my fly by main force.

HAL.—You should have allowed your reel to play and your line to run: you held him too tight.

POIET.—He was too powerful a fish for my tackle; and even if I had done so, would probably have broken me by running amongst the weeds.

HAL.—Let me tell you, my friend, you should never allow a fish to run to the weeds, or to strike across the stream; you should carry him always down stream, keeping his head high, and in the current. If in a weedy river you allow a large fish to run up stream, you are almost sure to lose him. There, I have hooked the companion of your lost fish on the other side of the stream,—a powerful creature: he tries, you see, to make way to the weeds, but I hold him tight.

POIET.—I see you are obliged to run with him, and have carried him safely through the weeds.

HAL.—I have him now in the rapids on the shallow, and I have no fear of losing him, unless he strikes the hook out of his mouth.

POIET.—He springs again and again.

HAL.—He is off; in one of these somersets he detached the steel, and he now leaps to celebrate his escape. We will leave this place, where there are more great fish, and return to it after a while, when the alarm produced by our operations has subsided.

PHYS.—That fish take the artificial fly at all is rather surprising to me, for in its most perfect form it is but a rude imitation of nature; and from the greedy manner in which it is seized, fish, I think, cannot possess a refined sense of smell, or any nervous system corresponding to the nasal one in animals that breathe air: no scent can be given to water by an artificial fly, or, at least, none like that of the natural fly.

HAL.—The principal use of the nostrils in fishes, I believe is to assist in the propulsion of water through the gills for performing the office of respiration, but I think there are some nerves in these organs which give fishes a sense of the qualities of the water, or substances dissolved in, or diffused through it, similar to our sense of smell, or, perhaps, rather our sense of taste, for there can be no doubt that fishes are attracted by scented pastes and scented worms, which are sometimes used by anglers that employ ground-baits; and in old angling-books there are usually receipts for attracting fish in this manner, and though the absurdity of many of these prescriptions is manifest, yet I do not think this proves that they are entirely useless, for, upon such principles, all the remedies for diseases in the old pharmacopœias would be null.*

* [The latter use assigned by the author to the nostrils of fishes, there is good reason to believe is the true one, their olfactory nerve commonly being large and very elaborately and curiously distributed on the membrane of the cavities.]

With respect to the fly, as it usually touches the stream by a very small surface, that of the air-bubbles on the fringes on its legs, it can scarcely affect the water so as to give it any power of communicating smell. And as you have seen a ripple or motion on the water is necessary to deceive fishes; and as they look at the fly from below, they see distinctly only the legs and body, which, when the colours are like those of the natural fly, may easily deceive them; the wings, which are the worst imitated parts of the artificial fly, seldom appear to them, except through the different refractive power of the moving water and the atmosphere, and when immersed, they form masses not unlike the wings of a drowned fly, or one wetted in rising.

* * * * *

It is now a quarter of an hour since we left the large pool: let us return to it; I see the fish are again rising.

POIET.—I am astonished! It appears to me that the very same fish are again feeding. There are two fish rising nearly in the same spot where they rose before: can they be the same fish?

HAL.—It is very possible. It is not likely that three other fish of that size should occupy the same haunts.

POIET.—But I thought after a fish had been hooked, he remained sick and sulky for some time, feeling his wounds uncomfortable.

HAL.—The fish that I hooked is not rising in the same place, and therefore, probably, was hurt by the hook; but one of these fish seems to be the same that carried off your fly, and it is probable that the hook only struck him in a part of the mouth where there are no nerves; and that he suffered little at the moment, and does not now feel his annoyance.

POIET.—I have seen him take four or five flies: I shall throw over him. There, he rose, but refused the fly. He has at least learnt, from the experiment he has made, to distinguish the natural from the artificial fly.

HAL.—This I think, always happens after a fish has been hooked with an artificial fly. He becomes cautious, and is seldom caught that year, at least with the same means in the same pool: but I dare say that fish might be taken with the natural fly; or, what is better, two upon the hook.

POIET.—Pray try him.

HAL.—I am no artist at this kind of angling, but Ornither I know has fished in June with the clubs at Stockbridge, where this method of fishing is usual. Pray let him try his fortune, though it is hardly fair play; and it is rather to endeavour to recover your tackle, than for the sake of the fish, that I encourage him to make the essay.

POIET.—Pray make no apologies for the trial. Such a fish—certainly a monster for this river—should be caught by fair means, if possible, but caught by any means.

ORN.—You lost that fish, and you over-rate his size, as you will see, if I have good luck. I put my live flies on the hook with regret and some disgust. I will not employ another person to be my minister of cruelty, as I remember a lady of fashion once did, who was very fond of fishing for perch, and who employed her daughter, a little girl of nine years of age, to pass the hook through the body of the worm! Now there is a good wind, and the fish has just taken a natural fly. I shall drop the flies, if possible, within a few inches of his nose. He has risen. He is caught! I must carry him down stream to avoid the bed of weeds above. I now have him on

fair ground, and he fights with vigour. Fortunately, my silk-worm gut is very strong, for he is not a fish to be trifled with. He begins to be tired; prepare the net. We have him safe, and see, your link hangs to his lower jaw: the hook had struck the cartilage on the outside of the bone, and the fly, probably, was scarcely felt by him.

PHYS.—I am surprised! That fish evidently had discovered that the artificial fly was a dangerous bait, yet he took the natural fly which was on a hook, and when the silk-worm gut must have been visible.

HAL.—I do not think he either saw the gut or the hook. In very bright weather and water, I have known very shy fish refuse even a hook baited with the natural fly, scared probably by some appearance of hook or gut. The vision of fishes when the surface is not ruffled is sufficiently keen. I have seen them rise at gnats so small as to be scarcely visible to my eye.

PHYS.—You just now said, that a fish pricked by the hook of an artificial fly would not usually take it again that season.

HAL.—I cannot be exact on that point: I have known a fish that I have pricked retain his station in the river, and refuse the artificial fly, day after day, for weeks together; but his memory may have been kept awake by this practice, and the recollection seems local and associated with surrounding objects; and if a pricked trout is chased into another pool, he will, I believe, soon again take the artificial fly. Or if the objects around him are changed, as in Autumn, by the decay of weeds, or by their being cut, the same thing happens; and a flood or a rough wind, I believe assists the fly-fisher, not merely by obscuring the vision of the fish, but in a river much fished, changing the appearance of their haunts:

large trouts almost always occupy particular stations, under, or close to, a large stone or tree ; and probably, most of their recollected sensations are connected with this dwelling.

PHYS.—I think I understand you, that the memory of the danger and pain does not last long, unless there is a permanent sensation with which it can remain associated,—such as the station of the trout ; and the recollection of the mere form of the artificial fly, without this association is evanescent.

ORN.—You are diving into metaphysics ; yet I think, in fowling, I have observed that the memory of birds is local. A woodcock that has been much shot at and scared in a particular wood, runs to the side where he has usually escaped, the moment he hears the dogs ; but if driven into a new wood, he seems to lose his acquired habits of caution, and becomes stupid.

POIET.—This great fish, that Ornither has just caught, must be nearly of the weight I assigned to him.

HAL.—O no ! he is, I think, above 5 lbs., but not 6 lbs. ; but we can form a more correct opinion by measuring him, which I can easily do, the but of my rod being a measure. He measures, from nose to fork, a very little less than twenty-four inches, and, consequently, upon the scale which is appropriate to well-fed trouts, should weigh 5 lbs. 10 oz.—which, within an ounce, I doubt not, is his weight.

PHYS.—O ! I see you take the mathematical law, that similar solids are to each other in the triplicate ratio of one of their dimensions.

HAL.—You are right.

PHYS.—But I think you are below the mark, for this appears to me an extraordinarily thick fish.

HAL.—He is a well-fed fish, but, in proportion, not

so thick as my model, which was a fish of 17 inches by 9 inches, and weighed 2 lbs. ;—this is my standard solid. We will try him. Ho! Mrs. B.!—bring your scales, and weigh this fish. There, you see, he weighs 5 lbs. $10\frac{1}{2}$ oz.

PHYS.—Well, I am pleased to see this fish, and amused with your sport; but though I have been imitating you in throwing the fly, as well as I can, yet not a trout has taken notice of my fly, and they seem scared by my appearance.

HAL.—Let me see you perform. There are two good trout, taking flies opposite that bank which you can reach. You threw too much line into the water, and scared them both; but I will take you to the rapid of the Tumbling Bay, where the river falls; there the quickness of the stream will prevent your line from falling deep, and the foam will conceal your person from the view of the fish. And let me advise you to fish only in the rapids till you have gained some experience in throwing the fly. There are several fish rising in that stream.

PHYS.—I have raised one, but he refused my fly.

HAL.—Now you have a fish.

PHYS.—I am delighted;—but he is a small one.

HAL.—Unluckily, it is a *dace*.

PHYS.—I have now a larger fish, which has pulled my line out.

HAL.—Give him time. That is a good trout. Now wind up; he is tired, and your own. I will land him. He is a fish to keep, being above 2 lbs.

PHYS.—I am well pleased.

HAL.—There are many larger trouts here: go on fishing, and you will hook some of them. And when you are tired of this rapid you will find another a quar-

ter of a mile below. And continue to fish with a short line, and drop your fly, or let it be carried by the wind on the water as lightly as possible. Well, Poietes, what success?

POIET.—I have been fishing in the stream above; but the flies are so abundant, that the large fish will not take my artificial fly, and I have caught only three fish, all of which the fisherman has thrown into the water, though I am sure one of them was more than 2 lbs.

HAL.—You may trust his knowledge: with a new angler, our keeper would be apt to favour the fisherman rather than the fish. But we will have all fish you wish to be killed, and above 2 lbs., put into the well of the boat, where they can be examined, and, if you desire, weighed and measured, and such kept as are worth keeping. No good angler should kill a fish if possible, till he is needed to be crimped; for the sooner he is dressed after this operation the better;—and I assure you, a well-fed trout of the Colne, crimped and cooled ten minutes before he is wanted for the kettle or the gridiron, is a fish little inferior to the best salmon of the best rivers. It is now nearly two o'clock, and there is a cloud over the sun; the fly is becoming less abundant; you are now likely, Poietes, to have better sport. Try in that deep pool, below the Tumbling Bay; I see two or three good fish rising there, and there is a lively breeze. The largest fish refuses your fly again and again; try the others. There, you have hooked him; now carry him down stream, and keep his head high, out of the weeds. He plunges and fights with great force;—he is the best-fed fish I have yet seen at the end of the line, and will weigh more, in proportion to his length. I will land him for you. There he is,—and measures 19 inches; and I dare say his weight is

not much short of 3 lbs. We will preserve him in the well.

POIET.—He has hardly any spots, and is silvery all over; and the whole of the lower part of his body is beautifully clean.

HAL.—He is likewise broad-backed; and you may observe his few spots are black, and these are very small. I have always remarked, in this river, that the nearer the fish approach to perfection, the colour of the body becomes more uniform,—pale olive above, and bright silver below; and these qualities are always connected with a small head,—or rather, an oval body, and deep-red flesh.

POIET.—May not the red spots be marks of disease—a hectic kind of beauty? For I observed in a very thin and poor fish, and great-headed, that I caught an hour ago, which had leeches sticking to it, a number of red spots, and a long black back, and black or bluish marks even on the belly.

HAL.—I do not think red spots a symptom of disease; for I have seen fish in other rivers, and even small fish in this river, in perfectly good season, with red spots; but the colours of fish are very capricious, and depend upon causes which cannot be easily defined. The colouring matter is not in the scales, but in the surface of the skin immediately beneath them, and is probably a secretion easily affected by the health of the animal. I have known fish, from some lakes in Ireland, mottled in a most singular way,—their colour being like that of the tortoise; the nature of the water, exposure to the light, and probably the kind of food, produce these effects. I think it possible, when trout feed much on hard substances, such as larvæ and their cases, and the ova of other fish, they have more red spots, and redder

fins. This is the case with the gillaroo and the char, who feed on analogous substances: and the trout, that have similar habits, might be expected to resemble them. When trout feed most on small fish, as minnows, and on flies, they have more tendency to become spotted with small black spots, and are generally more silvery. The Colne trout are, in their advanced state, of this kind; and so are the trout called in Ireland buddocks and dolochans, found in Loch Neah. Particular character becomes hereditary, and the effects of a peculiar food influence the appearance of the next generation. I hope, Ornither, you have had good sport.

ORN.—Excellent! Since you left me, below the weir, I have hooked at least fifteen or twenty good fish, and landed and saved eight above 2 lbs; but I have taken no fish like the great one which I caught by poaching with the natural flies. The trout rose wonderfully well within the last quarter of an hour, but they are now all still; and the river, which was in such active motion, is now perfectly quiet, and seems asleep and almost dead.

HAL.—It is past four o'clock, and some dark, heavy clouds are come on,—the fly is off. It is almost the hour for the signal of the dressing bell; and there is nothing more to be done now till evening. But see! our host is come to examine our fish in the well, and to inquire about our sport; and, I dare say, will order some of our fish to be dressed for the table.

HOST.—I hope, gentlemen, you have been amused?

HAL.—Most highly, sir. As a proof of it, there are in the fish-well eighteen good trout,—and one not much short of 6 lbs.; three above 4 lbs., and four above 3 lbs. in weight. I hope you will order that great fish for your dinner.

HOST.—We will see. He is a fine fish, and fit for a present, even for a prince—and you shall take him to a prince. Here is a fish, and there another, of the two next sizes, which I am sure will cut red. Prepare them, fisherman. And Haleius, you shall catch two or three perch, for another dish; I know there are some good ones below the piles of the weir; I saw them hunting the small fish there yesterday morning. Some minnows, ho!—and the perch rods!

HAL.—I am tired, sir, and would willingly avoid minnow fishing after such a morning's sport.

HOST.—Come, then, I will be a fisher for the table. I have one—and another, that will weigh nearly a pound a-piece. Now, there is a cunning perch that has stolen my minnow; I know he is a large one. He has robbed me again and again; and if I fish on in this way, with the hook through the upper lip, will I dare say, carry away all the minnows in the kettle. I shall put on a strong small hook, on a stout, though fine, gut, with slender wire round the top, and pass the hook through the back fin of the minnow, and try my sagacity against his. Lo! I have him!—and a very strong fish he is, and gone to the bottom; but even though the greatest perch in the river, he cannot bite the gut,—he will soon be tired and taken. He now comes up, and is landed. He must be above 3 lbs.—a magnificent perch! Kill him, and crimp him, fisherman; take our two trout, and the three perch to the kitchen, and let them be dressed as usual. You shall have a good dish of fish, worthy of such determined anglers. But I see one of your party coming up by the side of the river, who seems tired and out of spirits.

HAL.—It is Physicus, who has this day commenced his career as a fly-fisher; and who, I dare say, has been

as successful as the uninitiated generally are. I hope you have followed my advice, and been fortunate?

PHYS.—I caught two trout in the rapid where you left me; but they were small, and the fisherman threw them in. Below the weir, in the quick stream, I caught two dace, and what astonished me very much, a perch, which you see here, and which I thought never took the fly.

HAL.—O yes, sometimes; and particularly when it is below the surface: and what more?

PHYS.—By creeping on my knees, and dropping my fly over the bank, I hooked a very large fish which I saw rising, and which was like a salmon; but he was too strong for my tackle, ran out all my line, and at last broke off by entangling my link in a post in the river. I have been very unlucky! I am sure that fish was larger than the great one Ornither took with the natural fly.

HAL.—Come, you have been initiated, and I see begin to take an interest in the sport, and I do not despair of your becoming a distinguished angler.

PHYS.—With time and some patience: but I am sorry I tortured that enormous fish without taking him.

HAL.—I dare say he was a large fish; but I have known very correct and even cool reasoners in error on a point of this kind. You are acquainted with Chemicus; he is not an ardent fisherman, and certainly not addicted to romance: I will tell you an anecdote respecting him. He accompanied me to this very spot last year, on a visit to our host, and preferred angling for pike to fly fishing. After the amusement of a morning, he brought back with him to the house one pike, and with some degree of disappointment complained that he had hooked another of enormous size, which carried off

his tackle by main force, and which he was sure must have been above 10lbs. At dinner, on the table, there were two pikes; one the fish that Chemicus had caught, and another a little larger, somewhat more than 3 lbs. We put some questions as to who had caught this second pike, which we found had been taken by our host, who smiling, and with some kind of mystery, asked Chemicus if he thought it weighed 10lbs. Chemicus refused to acknowledge an identity between such a fish and the monster he had hooked; when my friend took out of his pocket a paper containing some hooks and tackle carefully wrapped up, and asked Chemicus if he had ever seen such an apparatus. Chemicus owned they were the hooks and tackle the great fish had carried away. "And I found them," said our friend, "in the mouth of that *little* fish which you see on the table, and which I caught half an hour ago."

HOST.—I answer for the correctness of this anecdote, but I do not sanction its application to the case of our novitiate in angling. I have seen a fish under that bank where he was so unfortunate, which I am sure was above four pounds, and which I dare say was the subject of his unsuccessful experiment.

POIET.—From what our host has just said, I conclude, Halieus, that fish do not usually change their stations.

HAL.—Large trouts unquestionably do not;—they always hide themselves under the same bank, stone, stock, or weed, as I said this morning before, and come out from their permanent habitations to feed; and when they have fled to their haunt, they may be taken there by the hand; and on this circumstance the practice of tickling trout is founded. A favourite place for a large trout in rivers is an eddy behind a rock or stone, where flies and small fishes are carried by the force of the

current: and such haunts are rarely unoccupied; for if a fish is taken out of one of them, his place is soon supplied by another, who quits for it a less convenient situation.

PHYS.—So much knowledge and practice is required to become a proficient, that I am afraid it is too late in life for me to begin to learn a new art.

HAL.—Do not despair. There was—alas! that I must say there was—an illustrious philosopher, who was nearly fifty before he made angling a pursuit, yet he became a distinguished fly-fisher, and the amusement occupied many of his leisure hours during the last twelve years of his life. He, indeed, applied his pre-eminent acuteness, his science and his philosophy to aid the resources, and exalt the pleasures of this amusement. I remember to have seen Dr. Wollaston, a few days after he had become a fly-fisher, carrying at his button-hole a piece of caoutchouc, or Indian rubber, when, by passing his silk-worm link through a fissure in the middle, he rendered it straight and fit for immediate use. Many other anglers will remember other ingenious devices of my admirable and ever-to-be lamented friend.

(They go to dinner.)

* * * * *

(They return from the house.)

EVENING.

HAL.—You have, I am sure, gentlemen, dined well; no one ever dined otherwise in this house. It is a beautiful calm evening, and many fish might be caught where we fished in the morning; but I will take you to another part of the river; you shall each catch a fish, and then we will give over; for the evening's sport should be kept till a late season,—July or August,—when

there is little fly on in the day-time: and it would be spoiling the diversion of our host, to catch or prick all the fish in the upper water; and with a gentleman so truly liberal, and so profuse of his means of giving pleasure to others, no improper liberties should be taken. I shall not fish myself, but shall have my pleasure in witnessing your sport. It must be in a boat, and you must steal slowly up the calm water, and glide like aërial beings on the surface, making no motion in the water, and showing no shadow. Your fly must be an orange or brown palmer with a yellow body; for the gray drake is not yet on the water. The fish here are large, and the river weedy, so you must take care of your fish and your tackle.

POIET.—We have at least passed over half-a-mile of water, and have seen no fish rise; yet there is a yellowish or reddish fly in the air, which moves like a drake; and there are clouds of pale-brown flies encircling the alders. Now, I think I see a large trout rise below that alder.

HAL.—That is not a trout, for he rises in a different place now, and is probably a large roach or chub; do not waste your time upon him. You may always know a large trout, when feeding in the evening. He rises continuously, or at small intervals,—in a still water, almost always in the same place—and makes little noise—barely elevating his mouth to suck in the fly, and sometimes showing his back-fin and tail. A large circle spreads around him; but there are seldom any bubbles when he breaks the water, which usually indicate the coarser fish: we will wait a few minutes; I know there must be trout here; and the sun is setting, and the yellow fly, or dun cut, coming on the water. See, beneath that alder, is a trout rising; and now there is another thirty yards higher up. Take care, get your line out in

another part of the water, and in order for reaching the fish, and do not throw till you are sure you can reach the spot, and throw at least half-a-yard above the fish.

ORN.—He rose, I suppose, at a natural fly, the moment my fly touched the water.

HAL.—Try again. You have hooked him; and you have done well not to strike when he rose. Now hold him tight, wind up your line, and carry him down the stream. Push the boat down stream, fisherman. Keep your fish's head up. He begins to tire,—and there is landed. A fine well-fed fish, not much less than 4 lbs. Throw him into the well. Now, Poietes, try that fish rising above,—and there are two more.

POIET.—I have him!

HAL.—Take care. He has turned you, and you have suffered him to run out your line, and he is gone into the weeds under the willow: let him fall down stream.

POIET.—I cannot get him out.

HAL.—Then wind up. I fear he is lost; yet we will try to recover him by taking the boat up. The line is loose: he has left the link entangled in the weeds, and carried your fly with him. He must have been a large fish, or he could not have disentangled himself from so strong a gut. Try again, there are fish now rising above and below; where the water is in motion, opposite that willow, there are two fish rising.

POIET.—I have one of them.

HAL.—Now you are doing well. Down with the boat, and drag your fish downwards. Continue to do so, as there are weeds all round you. You can master him now; keep him high, and he is your own. Put the net under him, and bring him into the boat; he is a well-fed fish, but not of the proper size for a victim: about 2 lbs. Now, Physicus, try your fortune with the

fish above, that rises so merrily still. You have him! Now use him as Poietes did the last. Very well; I see he is a large fish,—take your time. He is landed; a fish nearly of 3lbs., and in excellent season.

PHYS.—Anche Io son Pescatore—I too am a fisherman—a triumph.

HAL.—Now we have finished our fishing, and must return to the light supper of our host. It would be easy now, and between this hour and ten, to take half-a-dozen large fish in this part of the water; but for the reason I have already stated, it would be improper.

POIET.—Pray would not this be a good part of the water for day-fishing?

HAL.—Undoubtedly, a skilful angler might take fish here in the day; but the bank is shaded by trees, there is seldom any sensible wind on the water, and the apparatus and the boat in motion are easily perceived in the daylight; and the water is so deep, that a great quantity of fly is necessary to call up the fish; and in general there is a larger quantity of fly in hot summer evenings, than even in the brightest sunshine.

PHYS.—The fly appears to me like a moth that is now on the water.

HAL.—It is.

POIET.—What flies come on late in the season here?

HAL.—Flies of the same species; some darker, and some with a deeper shade of red; and there are likewise the true moths, the brown and white, which, in June and July, are seized with avidity by the fish; and being large flies, take large fish.

ORN.—Surely the May-fly season is not the only season for day-fishing in this river?

HAL.—Certainly not. There are as many fish to be taken, perhaps, in the Spring fishing; but, in this deep

river, they are seldom in good season till the May-fly has been on; and a fortnight hence they will be still better than even now. In September, there may be good fish taken here; but the autumnal flies are less plentiful in this river, than the spring flies.

PHYS.—Pray tell me what are the species of fly which take in these two seasons?

HAL.—You know that trout spawn or deposit their ova and milt in the end of the autumn or beginning of winter, from the middle of November till the beginning of January, their maturity depending upon the temperature of the season, their quantity of food, &c. For some time (a month or six weeks) before they are prepared for breeding, they become less fat, particularly the females; the large quantity of eggs, and their size, probably affecting the health of the animal, and compressing generally the vital organs in the abdomen. They are at least six weeks or two months after they have spawned, before they recover their flesh: and the time when these fish are at the worst, is likewise the worst time for fly-fishing; both on account of the cold weather, and because there are fewer flies on the water, than at any other season. Even in December and January, there are a few small gnats or water-flies on the water in the middle of the day, in bright days, or when there is sunshine. These are generally black; and they escape the influence of the frost, by the effects of light on their black bodies, and probably by the extreme rapidity of the motions of their fluids, and generally of their organs. They are found only at the surface of the water, where the temperature must be above the freezing point. In February a few double-winged water-flies which swim down the stream, are usually found in the middle of the day,—such as the willow-fly; and the

cow-dung-fly is sometimes carried on the water by winds. In March, there are several flies found on most rivers. The grannam or green-tail-fly, with a wing like a moth, comes on generally morning and evening, from five till eight o'clock, A.M., in mild weather, in the end of March, and through April. Then there are the blue and the brown, both *Ephemeræ*, which come on, the first in dark days, the second in bright days; these flies, when well imitated, are very destructive to fish. The first is a small fly, with a palish-yellow body, and slender beautiful wings, which rest on the back as it floats down the water. The second, called the cob in Wales, is three or four times as large, and has brown wings, which likewise protrude from the back; and its wings are shaded like those of a partridge, brown and yellow-brown. These three kinds of flies lay their eggs in the water, which produce larvæ that remain in the state of worms, feeding and breathing in the water till they are prepared for their metamorphosis, and quit the bottoms of the rivers, and the mud and stones, for the surface, and the light and air. The brown fly usually disappears before the end of April, likewise the grannam; but of the blue dun, there is a succession of different tints, or species, or varieties, which appear in the middle of the day all the summer and autumn long. These are the principal flies on the Wandle—the best and clearest stream near London. In early spring, these flies have dark-olive bodies; in the end of April, and the beginning of May, they are found yellow; and in the summer they become cinnamon-coloured; and again, as the winter approaches, gain a darker hue. I do not, however, mean to say, that they are the same flies, but more probably successive generations of *Ephemeræ* of the same species. The excess of heat seems

equally unfavourable, as the excess of cold, to the existence of the smaller species of water-insects, which, during the intensity of sunshine, seldom appear in summer, but rise morning and evening only. The blue dun has, in June and July, a yellow body; and there is a water-fly which, in the evening, is generally found before the moths appear, called the red-spinner. Towards the end of August, the Ephemeræ appear again in the middle of the day: a very pale small Ephemeræ, which is of the same colour as that which is seen in some rivers in the beginning of July. In September and October, this kind of fly is found with an olive body; and it becomes darker in October, and paler in November. There are two other flies which appear in the end of September, and continue during October, if the weather be mild: a large yellow fly, with a fleshy body and wings like a moth; and a small fly with four wings, with a dark or claret-coloured body, that when it falls on the water has its wings, like the great yellow fly, flat on its back. This, or a claret-bodied fly, very similar in character, may be likewise found in March or April, on some waters. In this river, I have often caught many large trout in April and the beginning of May, with the blue dun, having the yellow body; and, in the upper part of the stream below St. Albans, and between that and Watford, I have sometimes, even as early as April, caught fish in good condition: but the *true* season for the Colne, is the season of the May-fly. The same may be said of most of the large English rivers containing large trouts, and abounding in May-fly:—such as the Test and the Kennet; the one running by Stockbridge, the other by Hungerford. But in the Wandle at Carshalton and Beddington, the May-fly is not found; and the little blues are the constant,

and, when well imitated, killing flies, on this water ; to which may be joined a dark alder-fly, and a red evening fly. In the Avon, at Ringwood and Fordingbridge, the May-fly is likewise a killing fly ; but as this is a grayling river, the other flies, particularly the grannam and blue and brown, are good in spring, and the alder-fly or pale blue, later ; and the blue dun in September and October, and even November. In the streams in the mountainous parts of Britain, the spring and autumnal flies are by far the most killing. The Usk was formerly a very productive trout stream ; and the fish being well fed by the worms washed down by the winter floods, were often in good season, cutting red in March, and the beginning of April : and at this season the blues and browns, particularly when the water was a little stained after a small flood, afforded the angler good sport. In Herefordshire and Derbyshire, where trout and grayling are often found together, the same periods are generally best for angling ; but in the Dove, Lathkill, and Wye, with the natural May-fly, many fish may be taken ; and in old times, in peculiarly windy days, or high and troubled water, even the artificial May-fly, according to Cotton, was very killing.

POIET.—I have heard various accounts of the excellent fishing in some of the great lakes in Ireland. Can you tell us anything on the subject, and if the same flies may be used in that island ?

HAL.—I have been several times in Ireland, but never at this season, which is considered as best for lake-fishing. I have heard that, in some of the lakes in Westmeath, very large trout, and great quantities, may be taken in the beginning of June, with the very flies we have been using this day. Wind is necessary ; and a good angler sometimes takes in a day, or rather for-

merly took, from ten to twelve fish, which weighed from 3 to 10 lbs., and which occasionally were even larger. In the summer after June, and in the autumn, the only seasons when I have fished in Ireland, I have seldom taken any large trout; but in the river Boyle, late in October, after a flood, I once had some sport with these fish, that were running up the river from Lock Key to spawn. I caught one day two above 3 lbs., that took a large reddish-brown fly, of the same kind as a salmon-fly; and I saw some taken that weighed 5 lbs., and heard of one that equalled 9 lbs. These fish were in good season, even at this late period, and had no spots, but were coloured red and brown; mottled like tortoise-shell, only with smaller bars. I have in July, likewise, fished in Loch Con, near Ballina, and Loch Melvin, near Ballyshannon. In Loch Con, the party caught many small good trout, that cut red: and in the other, I caught a very few trout only; but as many of them were gillaroo or gizzard trout, as common trout.

POIET.—This must have been an interesting kind of fishing. In what does the gillaroo differ from the trout?

HAL.—In appearance very little, except that they have more red spots, and a yellow, or golden-coloured belly, and fins, and are generally a broader and thicker fish; but internally they have a different organization, possessing a large thick muscular stomach, which has been improperly compared to a fowl's, and which generally contains a quantity of small shell-fish, of three or four kinds: and though in those I caught, the stomachs were full of these shell-fish, yet they rose greedily at the fly.

POIET.—Are they not common trout, which have gained the habit of feeding on shell-fish?

HAL.—If so, they have been altered in a succession

of generations. The common trouts of this lake have stomachs like other trouts, which never, as far as my experience has gone, contain shell-fish; but of the gillaroo trout, I have caught with a fly some not longer than my finger, which have had as perfect a hard stomach as the larger ones, with the coats as thick in proportion, and the same shells within; so that this animal is at least *now* a distinct species, and is a sort of link between the trout and char, which has a stomach of the same kind with the gillaroo, but not quite so thick, and which feeds at the bottom in the same way. I have often looked in the lakes abroad for gillaroo trout, and never found one. In a small lake at the foot of the Crest of the Brenner, above 4,000 feet above the level of the sea, I once caught some trout, which, from their thickness and red spots, I suspected were gillaroo, but on opening the stomach, I found I was mistaken; it had no particular thickness, and was filled with grasshoppers: but there were *char*, which fed on *shell-fish*, in the same lake.

POIET.—Are water-flies found on all rivers?

HAL.—This is a question which I find it impossible to answer; yet from my own experience I should suppose, that in all the habitable parts of the globe certain water-flies exist wherever there is running water. Even in the most ardent temperature, gnats and musquitoes are found, which lay their congeries of eggs on the water, which, when hatched, become first worms, afterwards small shrimp-like aurelias, and lastly flies. There are a great number of the largest species of these flies on stagnant waters and lakes, which form a part of the food of various fishes, principally of the carp kind: but the true fisherman's flies,—those which are imitated in our art, principally belong to the northern, or at least

temperate part of Europe, and I believe are nowhere more abundant than in England. It appears to me, that since I have been a fisherman, which is now the best part of half a century, I have observed in some rivers where I have been accustomed to fish habitually, a diminution of the numbers of flies. There were always some seasons in which the temperature was favourable to a quantity of fly; for instance, fine warm days in spring for the grannam, or brown fly; and like days in May and June for the alder fly, May-fly, and stone-fly; but I should say that within these last twenty years I have observed a general diminution of the spring and autumnal flies, except in those rivers which are fed from sources that run from chalk, and which are perennial—such as the Wandle, and the Hampshire and Buckinghamshire rivers; in these streams the temperature is more uniform, and the quantity of water does not vary much. I attribute the change of the quantity of flies in the rivers to the cultivation of the country. Most of the bogs or marshes which fed many considerable streams are drained; and the consequence is, that they are more likely to be affected by severe droughts and great floods—the first killing, and the second washing away the larvæ and aurelias. May-flies thirty years ago were abundant in the upper part of the Teme river in Herefordshire, where it receives the Clun: they are now rarely seen. Most of the rivers of that part of England, as well as of the west, with the exception of those that rise in the still uncultivated parts of Dartmoor and Exmoor, are rapid and unfordable torrents after rain, and in dry summers little more than scanty rills; and Exmoor and Dartmoor, almost the only considerable remains of those moist, spongy, or peaty soils, which once covered the greatest part of the high lands of England,

are becoming cultivated, and their sources will gradually gain the same character as those of our midland and highly-improved counties. I cannot give you an idea of the effects of peat mosses and grassy marshes on the water thrown down from the atmosphere, better, than by comparing their effects to those of roofs of houses of thatched straw, as contrasted with roofs of slate, on a shower of rain. The slate begins to drop immediately, and sends down what it receives in a rapid torrent, and is dry soon after the shower is over. From the sponge-like roof of thatch, on the contrary, it is long before the water drops; but it continues dropping and wet for hours after the shower is over and the slate dry.

POIET.—You spoke just now of the gillaroo trout, as belonging only to Ireland. I can, however, hardly bring myself to believe, that such a fish is not to be found elsewhere. For lakes with shell-fish and char are common in various parts of Europe, and as the gillaroo trout is congenerous, it ought to exist both in Scotland and the Alpine countries.

HAL.—It is not possible from analogies of this kind to draw certain inferences. Subterraneous cavities and subterranean waters are common in various countries, yet the *Proteus Anguinus* is only found in two places in Carniola—at Adelsburg and Sittich. As I mentioned before, I have never yet met with a gillaroo trout except in Ireland. It is true, it is only lately that I have had my attention directed to the subject, and other fishermen or naturalists may be more fortunate.

POIET.—Have you ever observed any other varieties of the trout kind, which may be considered as, like the gillaroo, forming a distinct species?

HAL.—I think the par, samlet, or brandling, common to most of our rivers which communicate with the sea,

has a claim to be considered a distinct species; yet the history of this fish is so obscure, and so little understood, that, perhaps, I ought not to venture to give an account of it. But in doing so, you will consider me as rather asking for new information, than as attempting a satisfactory view of this little animal.

ORN.—I have seen this fish in the rivers of Wales and Herefordshire, and have heard it asserted on what appeared to me good authority, that it was a mule,—the offspring of a trout and a salmon.

HAL.—This opinion, I know, has been supported by the fact, that it is found only in streams, which are occasionally visited by salmon; yet I know no direct evidence in favour of the opinion, and I should think it much more probable, if it be a mixed race, that it is produced by the sea trout and common trout. In a small river, which runs into the Moy, near Ballina in Ireland, I once caught in October a great number of small sea trout, which were generally about half-a-pound in weight, and were all *males*; and unless it be supposed, that the females were in the river likewise, and would not take the fly, these fish, in which the milt was fully developed, could only have impregnated the ova of the common river trout. The sea trout and river trout are, indeed, so like each other in character, that such a mixture seems exceedingly probable; but I know no reason why such mules should always continue small, except that it may be a mark of imperfection. The only difference between the par and common small trout is in the colours, and its possessing one or two spines more in the pectoral fin. The par has large blue or olive-bluish marks on the sides, as if they had been made by the impression of the fingers of a hand; and hence the fish is called in some places *fingerling*. The river and sea trout seem

capable of changing permanently their places of residence; and sea trout appear often to become river trout. In this case they lose their silvery colour, and gain more spots; and in their offspring these changes are more distinct. Fish, likewise, which are ill-fed remain small; and pars are exceedingly numerous in those rivers where they are found, which are never separated from the sea by impassable falls; from which I think it possible that they are produced by a cross between sea and river trout.* The varieties of the common trout are

* The author, in supposing that the par may be produced from a cross between the river trout and the sea trout, does not mean to attach any importance to this idea. The fish differs so little from the common trout that it may be questioned, whether it is not more entitled to the character of a variety than of a species. In many rivers on the continent, the author has seen small trout with olive or brown marks, like those of the British par; and, a friend informs him, he has caught fishes of the same kind in the streams connected with the lake of Geneva. In rivers, flowing into the Danube, these small fish are very common; but, as well as he remembers, their marks are pale or yellowish-brown, or olive, and not dark or blue like those of our par. The salmon does not belong to any of these localities, but the hucho haunts the tributary streams of the Danube. The smelts, or young of the salmo hucho, or sea trout and lake trout, are all distinguished by the *uniform* dark colour of the back, and the silvery whiteness of the belly. He does not remember to have seen any of the streaked, or par varieties of trout in rivers, in which there was only *one* species, or variety of large salmo. The mottled colour of the skin is, he thinks, the strongest argument in favour of this little fish, being from a cross of two varieties, or races, which may be the case, and yet the fish be capable of breeding, and gaining this character of a peculiar variety; and he supposes different kinds of pars may be produced by crosses of the sea trout, the hucho, the lake trout, with the river trouts, or perhaps of the salmon, and this would account for their great numbers, and the various tints of the marks on their *sides*. If the hucho, as he believes, generally spawns in the late winter it may sometimes meet with trout spawning at the same time. He has seen salmon and trout in the Tweed in a similar state of maturity at the same time; and, in 1816, he remembers that he took a large female salmon that had the period of parturition protracted as late as March.

almost infinite ; from the great lake trout which weighs above 60 or 70 lbs., to the trouts of the little mountain brook, or small mountain lake, or tarn, which is scarcely larger than the finger. The smallest trout spawn nearly at the same time with the larger ones, and their ova are of the same size ; but in the large trout there are tens of thousands, and in the small one rarely as many as forty, —often from ten to forty. So that in the physical constitution of these animals, their production is diminished as their food is small in quantity ; and it is remarkable, that the ova of the large and beautiful species which exist in certain lakes, and which seem always to associate together, appear to produce offspring, which, in colour, form, and power of growth, and reproduction, resemble the parent fishes ; and they generally choose the same river for their spawning. Thus, in the lake of Guarda, the Benacus of the ancients, the magnificent trout, or *Salmo fario*, which in colour and appearance is like a fresh run salmon, spawns in the river at Riva, beginning to run up for that purpose in June, and continuing to do so all the summer ; and this river is fed by streams from snow and glaciers in the Tyrol, and is generally foul : whilst the small spotted common trouts, which are likewise found in this lake, go into the small brooks, which have their sources not far off, and in which, it is probable, they were originally bred. I have seen taken in the same net small fish of both these varieties, which were as marked as possible in their characters :—one silvery like a young salmon, blue on the back, and with small black spots only ; the other with yellow belly and red spots and an olive-coloured back. I have made similar observations in other lakes, particularly in that of the Traun near Gmünden, and likewise at Loch Neah in Ireland. In-

deed, considering the sea trout as the type of the species *trout*, I think all the other true trouts may not improperly be considered as varieties, which the differences of food and of habits have occasioned, in a long course of ages,—differences of shape and colours, transmitted to offspring in the same manner as in the variety of dogs, which may all be referred to one primitive type.*

PHYS.—I am somewhat amused at your idea of the change produced in the species of trout, by the formation of particular characters, by particular accidents, and their hereditary transmission. It reminds me of the ingenious, but somewhat unsound views of Darwin, on the same subject.

HAL.—I will not allow you to assimilate my views to those of an author, who, however ingenious, is far too speculative; whose poetry has always appeared to me weak philosophy, and his philosophy indifferent poetry: and to whom I have been often accustomed to apply Blumenbach's saying, that there were many things new, and many things true, in his doctrines; but that which was new was not true, and what was true, was not new.

POIET.—I think *Halius* is quite in the right to be a little angry at your observation, *Physicus*, in making him a disciple of a writer, who, as well as I can recol-

* I have known the number of spines in the pectoral fins different, in different varieties of trout: I have seen them 12, 13, and 14: but the anal fin always, I believe, contains 11 spines, the dorsal 12 or 13, the ventral 9, and the caudal 21. The smallest brook trout, when well and copiously fed, will increase in stews to four or five pounds in weight, but never attains the size or characters of lake trout.

Mr. Tonkin, of Polgaron, put some small river trout, $2\frac{1}{2}$ inches in length, into a newly-made pond. He took some of these out the second year, and they were above 12 inches in length; the third year, he took one out that was 16 inches; and the fourth year, one of 25 inches: this was in 1734. (*Carew's Survey of Cornwall*, p. 87. Lord de Dunstanville's edition.)

lect, has deduced the *genesis* of the human being, by a succession of changes dependent upon irritabilities, sensibilities, and appetencies, from the *fish*; blending the wild fancies of Buffon, with the profound ideas of Hartley, and thus endeavouring to give currency to an absurd romance, by mixing with it some philosophical truths. I hope your parallel will induce him to do us the favour to state his own notions more at large.

HAL.—Physicus has mistaken me; and I will explain. What I mentioned of the varieties of dogs, as sprung from one type, he will, I am sure, allow me to apply, with some modifications, to all our cultivated breeds of animals, whether horses, oxen, sheep, hogs, geese, ducks, turkeys, or pigeons; and he will allow that certain characters gained by accidents, either from peculiar food, air, water, or domestic treatment, are transmitted to, and often strengthened in the next generation; the qualities being, as it were, doubled, when belonging to both parents, and retained in spite of counteracting causes. It will be sufficient for me to mention only a few cases. The blood-horse of Arabia is become the favourite of the north of Europe, and the colts possess all the superior qualities of their parents, even in the polar circle. The offspring of the Merino sheep retain the fineness of their wool in England and Saxony. Poultry, bantams, tumbling and carrier pigeons, geese, ducks, turkeys, &c. all afford instances of the same kind; and in the goose and duck, not only is the colour of the feathers changed, but the form of the muscles of the legs and wings; those of the wings, being little employed, become weak and slender; those of the legs, on the contrary, being much used, are strong and fleshy; and it is well to know this—as, in the young birds, the muscles of the legs and thighs are the best parts for the

epicure, a large quantity of flesh being developed there, but not yet hardened or rendered tough by exercise. These facts are of the same kind, and depend on the same principles, as the peculiarity of the breeds or races in trouts. Fish, in a clear cool river, that feed much on larvæ, and that swallow their hard cases, become yellower, and the red spots increase so as to outnumber the black ones; and these qualities become fixed in the young fishes, and establish a particular variety. If trout from a lake, or another river of a different variety, were introduced into this river, they would not at once change their characters; but the change would take place gradually. Thus I have known trout from a lake in Scotland, remarkable for their deep red flesh, introduced into another lake, where the trout had only white flesh, and they retained the peculiar redness of their flesh for many years. At first they all associated together in spawning in the brook which fed the lake; but those newly introduced, were easily known from their darker backs and brighter sides. By degrees, however, from the influence of food, and other causes, they became changed; the young trout of the introduced variety, had flesh less red than their parents; and in about twenty years the variety was entirely lost, and all the fish were in their original white state. A very speculative reasoner might certainly defend the hypothesis, of the change of *species* in a long course of ages, from the establishment of particular characters as hereditary. It might be said that trout, after having thickened their stomachs by feeding on larvæ, with hard cases, gained the power of eating shell fish, and were gradually changed to gillaroos and to char; their red spots and the yellow colour of their belly and fins increasing. In the same manner it might be said, that the large trout, which

feed almost entirely on small fishes, gained more spines in the pectoral fins, and became a new species; but *I* shall not go so far; and I know no facts of this kind. The gillaroo and the char appear always with the same characters; and I have never seen any fish that seemed in a state of transition from a trout to a gillaroo or a char; which, I think, must have been the case, if such changes took place. I hope, after this explanation, Physicus will not find any analogy between my ideas and those of a school, to which I am not ambitious of being thought to belong: and that he will allow my views to be sound, or at least founded upon correct analogies.

POIET.—Do you know any facts of a similar kind, in confirmation of your idea that the par is a mule?

HAL.—I have heard of similar instances, but I cannot say I have myself witnessed them. The common carp and the cruscian are said to produce a mixed race—and likewise the rud and the roach; but I have never paid much attention to varieties of the carp kind. A friend of mine informed me, that in a branch of the Test, into which graylings had recently been introduced, his fisherman caught a fish, which appeared to be from a cross between the trout and grayling, having the high back fin of the grayling, and the head and spots of the trout: this is the more remarkable, if correct, as the grayling spawns in the late spring, and the trout in the late autumn or winter: yet I *do* recollect that I once took a grayling in the end of November, in which the ova were so large, as nearly to be ready for protrusion. The fisherman of the Gründtl See, in Styria, informed me, that he had seen a fish which he believed to be a mule between the trout and char, the fins of which resembled those of a trout, though the body was in other respects like that of a char. The seasons at which these two

species spawn approach nearer to each other; but the char spawns in still, and the trout in running water. In general, the trout are mature before the char; yet I have seen in the Leopoldstein See, in Styria, a female char, of which the eggs were almost fully developed as early as June: the fisherman of the Gründtl See said, that these peculiar fish were very rare, and that he caught only one in about 500 char. It is not, I think, impossible, that it may be an umbla, a fish that might be expected to be found in that deep, cold, Alpine lake, a peculiar species, and not a mixed variety. It is a fertile and very curious subject for new experiments, that of crossing the breeds of fishes, and offers a very interesting and untouched field of investigation, which I hope will soon be taken up by some enlightened country gentleman, who in this way might make not only curious, but useful discoveries.

POIET.—So much science would be required to make these experiments with success, and there would be so many difficulties in the way of preserving fishes at the time they are proper for re-production, that I fear very few country gentlemen would be capable of prosecuting the inquiry.

HAL.—The science required for this object is easily attained, and the difficulties are quite imaginary. Mr. Jacobi, a German gentleman, who made many years ago experiments on the increase of trout and salmon, informs us that the ova and milt of mature fish, recently dead, will produce living offspring. His plan of raising trout from the egg, was a very simple one. He had a box made with a small wire grating at one end in the cover, for admitting water from a fresh source or stream, and at the other end of the side of the box there were a number of holes to permit the exit of the water: the

bottom of the box was filled with pebbles and gravel of different sizes, which were kept covered with water that was always in motion. In November, or the beginning of December, when the trout were in full maturity for spawning, and collected in the rivers for this purpose upon beds of gravel, he caught males and females in a net, and, by the pressure of his hands, received the ova in a basin of water, and suffered the milt to pass into the basin; and after they had remained a few minutes together, he introduced them upon the gravel in the box, which was placed under a source of fresh, cool, and pure water. In a few weeks the eggs burst, and the box was filled with an immense number of young trout, which had a small bag attached to the lower part of their body, containing a part of the yolk of the egg, which was still their nourishment. In this state they were easily carried from place to place in confined portions of fresh water for some days, requiring, apparently, no food; but, after about a week, the nourishment in their bag being exhausted, they began to seek their food in the water, and rapidly increased in size. As I have said before, Mr. Jacobi assures us, that the experiment succeeded as well with mature fish, that had been killed for the purpose of procuring the roe and milt, these having been mixed together in cold water immediately after they were taken out of the body. I have had this experiment tried twice, and with perfect success; and it offers a very good mode of increasing, to any extent, the quantity of trout in rivers or lakes,—for the young ones are preserved from the attacks of fishes, and other voracious animals or insects, at the time when they are most easily destroyed, and perfectly helpless. The same plan, I have no doubt, would answer equally well with grayling, or other varieties of the salmo genus.

But, in all experiments of this kind, the great principle is, to have a constant current of fresh and aerated water running over the eggs. The uniform supply of air to the foetus in the egg, is essential for its life and growth, and such eggs as are not supplied with water, saturated with air, are unproductive. The experimenter must be guided exactly by the instinct of the parent fishes, who take care to deposit the eggs, that are to produce their offspring, only in sources continually abounding in fresh and aerated water.

PHYS.—But as every species of fish has a particular and usually different time for spawning, I do not see how it could be contrived to cross their breeds, or how the ova of a trout, which spawns in December, could be influenced by the milt of the grayling, which spawns in May; for I conclude it would be impossible to preserve the eggs of a fish out of the body, in a state in which they could retain or recover their vitality.

HAL.—I believe I mentioned before, that I had found instances in which the ova of fish were developed at a different period from their natural one; and I have no doubt, that a little inquiry respecting the habits of fishes, would enable us to acquire a knowledge of the circumstances which either hasten or retard their maturity. Plenty of food, and a genial season, hasten the period of their re-production, which is delayed by want of proper nourishment, and by unfavourable weather. Males and females likewise, confined from each other, have their re-productive powers impeded; and trout, grayling, and salmon, will not deposit their ova except in running water; so that, by keeping them in tanks, the period of their maturity might be considerably altered. I have seen char even which had been kept in confined water from September till July; and so slow

had been the progress of the ova, that they appeared to be about this time fit for exclusion ; though, in the natural course of things, they would have been ripe in the end of October of the year before. By attending to, and controlling all these circumstances, I have no doubt many interesting experiments might be made, as to the possibility of modifying the varieties of the salmon, by mixing the ova of one species with the milt of another. With fishes of other genera, the task would be still more easy. Carp, perch, and pike deposit their ova in still water in spring and summer, when it is supplied with air by the growth of vegetables : and it is to the leaves of plants, which afford a continual supply of oxygen to the water, that the eggs usually adhere ; so that researches of this kind might be conducted within doors in close vessels, filled with plants, exposed to the sun. I have myself kept minnows and sticklebacks alive for many months in the same confined quantity of water, containing a few *confervæ* ; and their ova and milt increased in the same manner, as if they had been in their natural situation.

ORN.—I conclude from your statements, Halieus, that nothing more is required for the production of fishes from impregnated eggs, than a constant supply of water of a certain temperature furnished with air ; and of course the same principles will apply to fishes of the sea.

HAL.—There can be no doubt of it : and fishes in spawning time always approach great shallows, or shores covered with weeds, that, in the process of their growth, under the influence of the sunshine, constantly supply pure air to the water in contact with them.

POIET.—In everything belonging to the economy of nature, I find new reasons for wondering at the designs

of Providence,—at the infinite intelligence by which so many complicated effects are produced by the most simple causes. The precipitation of water from the atmosphere, its rapid motion in rivers, and its falls in cataracts, not only preserve this element pure, but give it its vitality, and render it subservient even to the embryo life of the fish; and the storms which agitate the ocean, and mingle it with the atmosphere, supply at once food to marine plants, and afford a principle of life to the fishes which inhabit its depths. So that the perturbation and motion of the winds and waves possess a use, and ought to impress us with a beauty higher and more delightful even than that of the peaceful and glorious calm.

THIRD DAY.

HALIEUS—POIETES—ORNITHER—PHYSICUS.

SCENE—DENHAM.

Morning.

HAL.—You will soon take your leave, gentlemen, of this agreeable villa, but we must catch at least two brace of trout, to carry with us to London as a present for two worthy patrons of the angle. For though I know our liberal host will have a basket of fish packed up for each of our party, yet fish taken this morning will be imagined a more acceptable present than those caught yesterday. The May-fly is already upon the water, though not in great quantity,—and it will consequently be more easy to catch the fish, which I see are rising with great activity. I advise you to go to the deep

water below, where you will find the largest fish, and I will soon follow you.

POIET.—I hope I shall catch a large fish,—a companion to that which Ornither took yesterday with a natural fly.

[*Halieus leaves them fishing, and returns to the house ; but soon comes back and joins his companions, whom he finds fishing below in the river.*]

HAL.—Well, gentlemen, what sport?

POIET.—The fish are rising every where ; but though we have been throwing over them with all our skill for a quarter of an hour, yet not a single one will take, and I am afraid we shall return to breakfast without our prey.

HAL.—I will try ; but I shall go to the other side, where I see a very large fish rising. There!—I have him at the very first throw. Land this fish, and put him into the well. Now I have another ; and I have no doubt I could take half-a-dozen in this very place, where you have been so long fishing without success.

PHYS.—You must have a different fly ; or have you some unguent or charm to tempt the fish?

HAL.—No such thing. If any of you will give me your rod and fly, I will answer for it I shall have the same success. I take your rod, Physicus.—And lo ! I have a fish !

PHYS.—What can be the reason of this ? It is perfectly inexplicable to me. Yet Poietes seems to throw as light as you do, and as well as he did yesterday.

HAL.—I am surprised that you, who are a philosopher, cannot discover the reason of this. Think a little.

ALL.—We cannot.

HAL.—As you are my scholars, I believe I must teach you. The sun is bright, and you have been, naturally enough, fishing with your backs to the sun, which, not being very high, has thrown the shadows of your rods and yourselves upon the water, and you have alarmed the fish, whenever you have thrown a fly. You see I have fished with my face towards the sun, and though inconvenienced by the light, have given no alarm. Follow my example, and you will soon have sport, as there is a breeze playing on the water.

PHYS.—Your sagacity puts me in mind of an anecdote which I remember to have heard respecting the late eloquent statesman, Charles James Fox; who, walking up Bond-street from one of the club-houses with an illustrious personage, laid him a wager that he would see more cats than the Prince in his walk, and that he might take which side of the street he liked. When they got to the top, it was found that Mr. Fox had seen thirteen cats, and the Prince not one. The royal personage asked for an explanation of this apparent miracle, and Mr. Fox said, “Your Royal Highness took, of course, the shady side of the way, as most agreeable; I knew that the sunny side would be left to me, and cats always prefer the sunshine.”

HAL.—There! Poietes, by following my advice, you have immediately hooked a fish; and while you are catching a brace, I will tell you an anecdote, which as much relates to fly-fishing, as that of Physicus, and affords an elucidation of a particular effect of light.

A manufacturer of carmine, who was aware of the superiority of the French colour, went to Lyons for the purpose of improving his process, and bargained with the most celebrated manufacturer in that capital, for the acquisition of his secret, for which he was to pay a

thousand pounds. He was shown all the processes, and saw a beautiful colour produced ; yet he found not the least difference in the French mode of fabrication, and that which he had constantly adopted. He appealed to the manufacturer, and insisted that he must have concealed something. The manufacturer assured him that he had not, and invited him to see the process a second time. He minutely examined the water and the materials, which were the same as his own,—and, very much surprised, said, “I have lost my labour and my money, for the air of England does not permit us to make good carmine.” “Stay,” says the Frenchman, “do not deceive yourself: what kind of weather is it now?” “A bright sunny day,” said the Englishman. “And such are the days,” said the Frenchman, “on which I make my colour. Were I to attempt to manufacture it on a dark or cloudy day, my result would be the same as yours. Let me advise you, my friend, always to make carmine on bright and sunny days.” “I will,” says the Englishman ; “but I fear I shall make very little in London.”

POIET.—Your anecdote is as much to the purpose as Physicus’s ; yet I am much obliged to you for the hint respecting the effect of shadow, for I have several times in May and June, had to complain of too clear a sky, and wished, with Cotton, for

A day with not too bright a beam :
A warm, but not a scorching, sun.

HAL.—Whilst we have been conversing, the May-flies, which were in such quantities, have become much fewer ; and I believe the reason is, that they have been greatly diminished by the flocks of swallows, which every where pursue them : I have seen a single swallow

take four, in less than a quarter of a minute, that were descending to the water.

POIET.—I delight in this living landscape! The swallow is one of my favourite birds, and a rival of the nightingale; for he cheers my sense of seeing as much as the other does my sense of hearing. He is the glad prophet of the year—the harbinger of the best season: he lives a life of enjoyment amongst the loveliest forms of nature: winter is unknown to him; and he leaves the green meadows of England in autumn, for the myrtle and orange groves of Italy, and for the palms of Africa:—he has always objects of pursuit, and his success is secure. Even the beings selected for his prey are poetical, beautiful, and transient. The ephemeræ are saved by his means from a slow and lingering death in the evening, and killed in a moment, when they have known nothing of life but pleasure. He is the constant destroyer of insects,—the friend of man; and, with the stork and ibis, may be regarded as a sacred bird. His instinct, which gives his appointed seasons, and teaches him always when and where to move, may be regarded as flowing from a Divine Source; and he belongs to the Oracles of Nature which speak the awful and intelligible language of a present Deity.

FOURTH DAY.

HALIEUS—POIETES—ORNITHER—PHYSICUS.

FISHING FOR SALMON AND SEA TROUT.

Scene—Loch Maree, West of Rosshire, Scotland. Time—Middle of July.

POIET.—I begin to be tired. This is really a long day's journey; and these last ten miles through bogs, with no other view than that of mountains half hid in mists, and brown waters that can hardly be called lakes, and with no other trees than a few stunted birches, that look so little alive, that they might be supposed immediately descended from the bog-wood, every where scattered beneath our feet, have rendered it extremely tedious. This is the most barren part of one of the most desolate countries I have ever passed through in Europe; and though the inn at Strathgarve is tolerable, that of Auchnasheen is certainly the worst I have ever seen,—and I hope the worst I shall ever see. We ought to have good amusement at Pool Ewe, to compensate us for this uncomfortable day's journey.

HAL.—I trust we shall have sport, as far as salmon and sea trout can furnish sport. But the difficulties of our journey are almost over. See, Loch Maree is stretched at our feet, and a good boat with four oars will carry us in four or five hours to our fishing ground; a time that will not be misspent, for this lake is not devoid of beautiful, and even grand scenery.

POIET.—The scenery begins to improve; and that cloud-breasted mountain on the left is of the best character of Scotch mountains: these woods, likewise, are respectable for this northern country. I think I see

islands also in the distance: and the quantity of cloud always gives effect to this kind of view; and perhaps, without such assistance to the imagination, there would be nothing even approaching to the sublime in these countries; but cloud and mist, by creating obscurity and offering a substitute for greatness and distance, give something of an Alpine and majestic character to this region.

ORN.—As we are now fixed in our places in the boat, you will surely put out a rod or two with a set of flies, or try the tail of the par for a large trout or salmon: our fishing will not hinder our progress.

HAL.—In most other lakes I should do so; here I have often tried the experiment, but never with success. This lake is extremely deep, and there are few fish which haunt it generally except char; and salmon seldom rest but in particular parts along the shore, which we shall not touch. Our voyage will be a picturesque, rather than an angling one. I see we shall have little occasion for the oars, for a strong breeze is rising, and blowing directly down the lake; we shall be in it in a minute. Hoist the sails! On we go!—we shall make our voyage in half the number of hours I had calculated upon; and I hope to catch a salmon in time for dinner.

POIET.—The scenery improves as we advance nearer the lower parts of the lake. The mountains become higher, and that small island or peninsula presents a bold, craggy outline; and the birch wood below it, and the pines above, form a scene somewhat Alpine in character. But what is that large bird soaring above the pointed rock, towards the end of the lake? Surely it is an eagle!

HAL.—You are right, it is an eagle, and of a rare and peculiar species—the gray or silver eagle, a noble bird!

From the size of the animal, it must be the female ; and her aery is in that high rock. I dare say the male is not far off.

PHYS.—I think I see another bird, of a smaller size, perched on the rock below, and which is similar in form.

HAL.—You do : it is the consort of that beautiful and powerful bird ; and I have no doubt their young ones are near at hand.

POIET.—Look at the bird ! How she dashes into the water, falling like a rock, and raising a column of spray : she has dropped from a great height. And now she rises again into the air : what an extraordinary sight !

HAL.—She is pursuing her prey, and is one of our fraternity,—a catcher of fish. She has missed her quarry this time, and has soared further down towards the river, to fall again from a great height. There ! You see her rise with a fish in her talons.

POIET.—She gives interest to this scene, which I hardly expected to have found. Pray are there many of these animals in this country ?

HAL.—Of this species I have seen but these two, and I believe the young ones migrate as soon as they can provide for themselves ; for this solitary bird requires a large space to move and feed in, and does not allow its offspring to partake its reign, or to live near it. Of other species of the eagle, there are some in different parts of the mountains, particularly of the osprey, and the great fishing and brown eagle. I once saw a very fine and interesting sight above one of the crags of Ben Weevis, near Strathgarve, as I was going, on the 20th of August, in pursuit of black game. Two parent eagles were teaching their offspring—two young birds, the manœuvres of flight. They began by rising from the top of a mountain in the eye of the sun (it was about

mid-day, and bright for this climate). They at first made small circles, and the young birds imitated them ; they paused on their wings, waiting till they had made their first flight, and then took a second and larger gyration,—always rising towards the sun, and enlarging their circle of flight so as to make a gradually extending spiral. The young ones still slowly followed, apparently flying better as they mounted ; and they continued this sublime kind of exercise, always rising, till they became mere points in the air, and the young ones were lost, and afterwards their parents, to our aching sight.* But we have touched the shore, and the lake has terminated ; you are now on the river Ewe.

POIET.—Are we to fish here ? It is a broad clear stream, but I see no fish, and cannot think it a good angling river.

HAL.—We are nearly a mile above our fishing station, and we must first see our quarters and provide for our lodging, before we begin our fishing : to the inn we have only a short walk.

POIET.—Why this inn is a second edition of Auchnasheen.

HAL.—The interior is better than the exterior, thanks to the Laird of Brahan : we shall find one tolerable room and bed ; and we must put up our cots and provide our food. What is our store, Mr. Purveyor ?

PHYS.—I know we have good bread, tea, and sugar. Then there is the quarter of roebuck presented to us at Gordon Castle ; and Ornither has furnished us with a brace of wild ducks, three leash of snipes, and a brace of golden plovers, by his mountain expedition of yesterday ; and for fish we depend on you. Yet our

* [This very poetical incident, the author described in Verse. Vide Vol. I. p. 279.]

host says there are fresh herrings to be had, and small codfish, and salmon and trout in any quantity, and the claret and the Ferintosh are safe.

HAL.—Why we shall fare sumptuously. As it is not time yet for shooting grouse, we must divide our spoil for the few days we shall stay here. Yet there are young snipes and plovers on the mountains above, and I have no doubt we might obtain the Laird's permission to kill a roebuck in the woods or a hart on the mountains; but this is always an uncertain event, and I advise you, Ornither, to become a fisherman.

ORN.—I shall wait till I see the results of your skill. At all events, in this country I can never want amusement, and I dare say there are plenty of seals at the mouth of the river, and killing them is more useful to other fishermen than catching fish.

HAL.—Let there be a kettle of water with salt ready boiling in an hour, mine host, for the fish we catch or buy; and see that the potatoes are well dressed: the servants will look to the rest of our fare. Now for our rods.

POIET.—This is a fine river; clear, full, but not too large: with the two handed rod it may be commanded in most parts.

HAL.—It is larger than usual. The strong wind which brought us so quickly down has made it fuller; and it is not in such good order for fishing as it was before the wind rose.

POIET.—I thought the river was always the better for a flood, when clear.

HAL.—Better after a flood from rain; for this brings the fish up, who know when rain is coming, and likewise brings down food and makes the fish feed. But when the water is raised by a strong wind, the fish

never run, as they are sure to find no increase in the spring heads, which are their objects in running.

POIET.—You give the fish credit for great sagacity.

HAL.—Call it instinct rather; for if they *reasoned*, they would run with every large water, whether from wind or rain. What the feeling or power is, which makes them travel with rain, I will not pretend to define. But now for our sport.

POIET.—The fish are beginning to rise; I have seen two here already, and there is a third, and a fourth—scarcely a quarter of a minute elapses without a fish rising in some parts of the pool.

HAL.—As the day is dark, I shall use a bright and rather a large fly, with jay's hackle, kingfisher's feather under the wing, and golden pheasant's tail, and wing of mixed grouse and argus pheasant's tail. I shall throw over these fish: I ought to raise one.

POIET.—Either you are not skilful, or the fish know their danger: they will not rise.

HAL.—I will try another and a smaller fly.

POIET.—You do nothing.

HAL.—I have changed my fly a third time, yet no fish rises. I cannot understand this. The water is not in good order, or I should certainly have raised a fish or two. Now I will wager ten to one, that this pool has been fished before to-day.

ORN.—By whom?

HAL.—I know not; but take my wager and we will ascertain.

ORN.—I shall ascertain without the wager if possible. See, a man connected with the fishery advances, let us ask him.—There you see; it has been fished once or twice by one, who claims without charter the right of angling.

HAL.—I told you so. Now I know this, I shall put on another kind of fly, such as I am sure they have not seen this day.

POIET.—It is very small and very gaudy, I believe made with humming bird's feathers.

HAL.—No. The brightest Java dove's hackle, kingfisher's blue, and golden pheasant's feathers, and the red feathers of the paroquet. There was a fish that rose and missed the fly—a sea trout. There, he has taken it, a fresh run fish, from his white belly and blue back.

POIET.—How he springs out of the water! He must be 6 or 7 lbs.

HAL.—Under five, I am sure; he will soon be tired. He fights with less spirit: put the net under him. There, he is a fine-fed sea trout, between 4 and 5 lbs. But our intrusive brother angler (as I must call him) is coming down the river to take his evening cast. A stout Highlander, with a powerful tail,—or, as we should call it in England, *suite*. He is resolved not to be driven off, and I am not sure that the Laird himself could divert him from his purpose, except by a stronger tail, and force of arms; but I will try my eloquence upon him. “Sir, we hope you will excuse us for fishing in this pool, where it seems you were going to take your cast; but the Laird has desired us to stand in his shoes for a few days, and has given up angling while we are here; and as we come nearly a thousand miles for this amusement, we are sure you are too much of a gentleman to spoil our sport; and we will take care to supply your fish kettle while we are here, morning and evening, and we shall send you, as we hope, a salmon before night.”

POIET.—He grumbles good sport to us, and is off with his tail: you have hit him in the right place. He is

a pot fisher, I am sure, and somewhat hungry, and provided he gets the salmon, does not care who catches it!

HAL.—You are severe on the Highland gentleman, and I think extremely unjust. Nothing could be more ready than his assent, and a keen fisherman must not be expected to be in the best possible humour, when he finds sport which he believes he has a right to, and which perhaps he generally enjoys without interruption, taken away from him by entire strangers. There is, I know, a disputed point about fishing with the rod, between him and the Laird; and it would have been too much to have anticipated a courteous greeting from one, who considers us as the representatives of an enemy. But I see there is a large fish which has just risen at the tail of the pool. I think he is fresh run from the sea, for the tide is coming in. My fly and tackle are almost too fine for so large a fish, and I will put on my first fly with a very strong single gut link and a stretcher of triple gut. He has taken my fly, and I hold him—a powerful fish: he must be between 10 and 15 lbs. He fights well, and tries to get up the rapid at the top of the pool. I must try my strength with him, to keep him off that rock, or he will break me. I have turned him, and he is now in a good part of the pool: such a fish cannot be tired in a minute or two, but requires from ten to twenty, depending upon his activity and strength, and the rapidity of the stream he moves against. He is now playing against the strongest rapid in the river, and will soon give in, should he keep his present place.

POIET.—You have tired him.

HAL.—He seems fairly tired: I shall bring him in to shore. Now gaff him; strike as near the tail as you can. He is safe; we must prepare him for the pot.

Give him a stunning blow on the head to deprive him of sensation, and then make a transverse cut just below the gills, and crimp him, by cutting to the bone on each side, so as almost to divide him into slices: and now hold him by the tail that he may bleed. There is a small spring, I see, close under that bank, which I dare say has the mean temperature of the atmosphere in this climate, and is much under 50° —place him there, and let him remain for ten minutes; then carry him to the pot, and before you put in a slice let the water and salt boil furiously, and give time to the water to recover its heat before you throw in another; and so proceed with the whole fish: leave the head out, and throw in the thickest pieces first.

PHYS.—Why did you not crimp your trout?

HAL.—We will have him fried. Our poacher prevented me from attending to the preparation; but for frying he is better not crimped, as he is not large enough to give good transverse slices.

POIET.—This salmon is a good fish, and fresh, as you said, from the sea. You see the salt-water louse adheres to his sides, and he is bright and silvery, and a thick fish; I dare say his weight is not less than 14 lbs., and I know of no better fish for the table, than one of that size.

PHYS.—It appears to me that so powerful a fish ought to have struggled much longer: yet, without great exertions on your part, in ten minutes he appeared quite exhausted, and lay on his side, as if dying: this induces me to suppose, that there must be some truth in the vulgar opinion of anglers, that fish are, as it were, drowned by the play of the rod and reel.

HAL.—The vulgar opinion of anglers on this subject, I believe to be perfectly correct: though, to apply the

word drowning to an animal that lives in the water, is not quite a fit use of language. Fish, as you ought to know, respire by passing water, which always holds common air in solution, through their gills or bronchial membrane, by the use of a system of muscles surrounding the fauces, which occasion constant contractions and expansions, or openings and closings of this membrane, and the life of the fish is dependent on the process, in the same manner as that of a quadruped is, on inspiring and expiring air. When a fish is hooked in the upper part of the mouth, by the strength of the rod applied as a lever to the line, it is scarcely possible for him to open the gills, as long as this force is exerted, particularly when he is moving in a rapid stream; and when he is hooked in the lower jaw, his mouth is kept closed by the same application of the strength of the rod, so that no aerated water can be inspired. Under these circumstances, he is quickly deprived of his vital forces, particularly when he exhausts his strength by moving in a rapid stream. A fish, hooked in a part of the mouth where the force of the rod will render his efforts to respire unavailing, is much in the same state as that of a deer caught round the neck by the lasso of a South American peon, who gallops forwards, dragging his victim after him, which is killed by strangulation, in a very short time. When fishes are hooked foul, that is, on the outside of the body, as in the fins or tail, they will often fight for many hours; and in such cases, very large salmon are seldom caught, as they retain their powers of breathing unimpaired; and if they do not exhaust themselves by violent muscular efforts, they may bid defiance to the temper and the skill of the fisherman. A large salmon, hooked in the upper part of the mouth, in the cartilage or bone, will sometimes likewise

fight for a long while, particularly if he keep in the deep and still parts of the river : for he is able to prevent the force of the hook, applied by the rod, from interfering with his respiration ; and by a powerful effort, can maintain his place, and continue to breathe, in spite of the exertions of the angler. A fish, in such case, is said to be sulky ; and his instinct, or his sagacity, generally enables him to conquer his enemy. It is, however, rarely that fishes hooked in the mouth are capable of using freely the muscles subservient to respiration ; and their powers are generally, sooner or later, destroyed by suffocation.

POIET.—The explanation that you have just been giving us of the effects of playing fish, I confess, alarms me, and makes me more afraid than I was before, that we are pursuing a very cruel amusement ; for death, by strangling, I conceive, must be very laborious, slow, and painful.

PHYS.—I think as I did before I was an angler, as to the merciless character of field-sports ; but I doubt if this part of the process of the fly-fisher ought so strongly to alarm your feelings. As far as analogies from warm-blooded animals can apply to the case, the death that follows obstructed respiration, is quick, and preceded by insensibility. There are many instances of persons who have recovered from the apparent death produced by drowning, and had no recollection of any violence or intense agony ; indeed, the alarm or passion of fear, generally absorbs all the sensibility, and the physical suffering is lost in the mental agitation. I can answer from my own experience, that there is no pain which precedes the insensibility occasioned by breathing gases unfitted for supporting life, but oftener a pleasurable feeling, as in the case of the respiration of nitrous oxide.

And in the suffocation produced by the gradual abstraction of air in a close room, where charcoal is burning, we have the record of the son of a celebrated chemist, that the sensation which precedes the deep sleep that ends in death, is agreeable. There is far more pain in recovering from the insensibility produced by the abstraction of air, than in undergoing it, as I can answer from my own feelings; and it is, I believe, quite true, what has been asserted, that the pain of being born, which is acquiring the power of respiration, is greater than that of dying, which is losing the power.

ORN.—I have heard that persons, who have been recovered from the insensibility produced by hanging, have never any recollection of the sufferings which preceded it; and as the blood is immediately determined to the head in this operation, probably apoplectic insensibility is almost instantaneous.

HAL.—The laws of nature are all directed by Divine Wisdom for the purpose of preserving life, and increasing happiness. Pain seems in all cases to precede the mutilation or destruction of those organs which are essential to vitality, and for *the end* of preserving them; but the mere process of dying, seems to be the falling into a deep slumber; and in animals, who have no fear of death dependent upon imagination, it can hardly be accompanied by very intense suffering. In the human being, moral and intellectual motives constantly operate in enhancing the fear of death, which, without these motives in a reasoning being, would probably become null, and the love of life be lost upon every slight occasion of pain or disgust; but imagination is creative with respect to both these passions, which, if they exist in animals, exist independent of reason, or as instincts. Pain seems intended by an all-wise Providence to pre-

vent the *dissolution* of organs, and cannot follow their *destruction*. I know several instances in which the process of death has been observed, even to its termination, by good philosophers; and the instances are worth repeating: Dr. Cullen, when dying, is said to have faintly articulated to one of his intimates, "I wish I had the power of writing or speaking, for then I would describe to you how pleasant a thing it is to die." Dr. Black, worn out by age, and a disposition to pulmonary hemorrhage, which obliged him to live very low, whilst eating his customary meal of bread and milk, fell asleep, and died in so tranquil a manner, that he had not even spilt the contents of the cup which rested on his knee. And the late Sir Charles Blagden, whilst at a social meal with his friends, Mons. and Mad. Berthollet and Gay Lussac, died in his chair so quietly, that not a drop of the coffee in the cup which he held in his hand, was spilt.

POIET.—Give us no more such instances, for I do not think it wise to diminish the love of life, or to destroy the fear of death.

HAL.—There is no danger of this. These passions are founded on immutable laws of our nature, which philosophy cannot change; and it would be good, if we could give the same security of duration to the love of virtue, and the fear of vice or shame, which are connected with immutable interests, and which ought to occupy far more the consideration of beings destined for immortality.—But to our business.

Now we have fish for dinner, my task is finished: Physicus and Poietes, try your skill. I have not fished over the best parts of this pool: you may catch a brace of fish here before dinner is ready.

PHYS.—It is too late; and I shall go and see that all is right.

POIET.—I will take one or two casts ; but give me your fly : I like always to be sure that the tackle is taking.

HAL.—Try at first the very top of the pool,—though I fear you will get nothing there ; but here is a cast which I think the Highlander can hardly have commanded from the other side, and which is rarely without a good fish. There, he rose : a large trout of 10lbs., or a salmon. Now wait a few minutes. When a fish has missed the fly, he will not rise again till after a pause—particularly if he has been for some time in the fresh water. Now try him again. He has risen, but he is a dark fish, that has been some time in the water, and he tries to drown the fly with a blow of his tail. I fear you will not hook him, except foul,—when most likely he would break you. Try the bottom of the pool, below where I caught my fish.

POIET.—I have tried all the casts, and nothing rises.

HAL.—Come, we will change the fly for that which I used.

POIET.—Now I have one : he has taken the fly under water, and I cannot see him.

HAL.—Straighten your line, and we shall soon see him. He is a sea-trout, but not a large one.

POIET.—But he fights like a salmon, and must be near 5 lbs.

HAL.—Under 3 lbs. ; but these fish are always strong and active, and sometimes give more sport than larger fish. Shorten your line, or he will carry you over the stones and cut the link gut. He is there already : you have allowed him to carry out too much line ; wind up as quick as you can, and keep a tight hand upon him. He is now back to a good place, and in a few minutes more will be spent. I have the net. There, he is a

sea-trout of nearly 3 lbs. This will be a good addition to our dinner : I will crimp him, that you may compare boiled sea-trout with broiled, and with salmon. Now, if you please, we will cool this fish at the spring, and then go to our inn.

POIET.—If you like. I am endeavouring to find a reason for the effect of crimping and cold in preserving the curd of fish. Have you ever thought on this subject?

HAL.—Yes : I conclude that the fat of salmon between the flakes of the muscles, is mixed with much albumen and gelatine, and is extremely liable to decompose ; and by keeping it cool, the decomposition is retarded : and by the boiling salt and water, which is of a higher temperature than that of common boiling water, the albumen is coagulated, and the curdiness preserved. The crimping, by preventing the irritability of the fibre from being gradually exhausted, seems to preserve it so hard and crisp, that it breaks under the teeth ; and a fresh fish, not crimped, is generally tough. A friend of mine, an excellent angler, has made some experiments on the fat of fish ; and he considers the red colour of trout, salmon, and char, as owing to a peculiar coloured oil, which may be extracted by alcohol ; and this accounts for the want of it in fish that have fed ill, and after spawning. In general, the depth of the red colour and the quantity of curd are proportional.

POIET.—Would not the fish be still better, or at least possess more curd, if caught in a net and killed immediately ? In the operation of tiring by the reel, there must be considerable muscular exertion, and I should suppose expenditure of oily matter.

HAL.—There can be no doubt but the fish would be in a more perfect state for the table from the nets ; yet a fish in high season does not lose so much fat during the

short time he is on the hook, as to make much difference; and I am not sure that the action of crimping after, does not give a better sort of crispness to the fibre. This, however, may be fancy; we will discuss the matter again at table. See! our companion on the lake, the eagle, is coming down the river, and has pounced upon a fish in the pool near the sea.

PHYS.—I fear he will interfere with our sport: let us request Ornither to shoot him. I wish to see him nearer, and to preserve him as a specimen for the Zoological Society.

HAL.—O! no. He will not spoil our sport; and I think it would be a pity to deprive this spot of one of its poetical ornaments. Besides, the pool where he is now fishing, contains scarcely anything but trout; it is too shallow for salmon, who run into the cruives.

POIET.—I am of your opinion, and shall use my eloquence to prevent Ornither from attempting the life of so beautiful a bird; so majestic in its form, so well suited to the scenery, and so picturesque in all its habits.

THE INNKEEPER.—Gentlemen, dinner is ready.

THE DINNER.

HAL.—Now take your places. What think you of our fish?

PHYS.—I never ate better; but I want the Harvey or Reading sauce.

HAL.—Pray let me entreat you to use no other sauce than the water in which he was boiled. I assure you this is the true Epicurean way of eating fresh salmon: and for the trout, use only a little vinegar and mustard,—a sauce *à la Tartare*, without the onions.

POIET.—Well, nothing can be better; and I do not think fresh net-caught fish can be superior to these.

HAL.—And these snipes are excellent. Either my journey has given me an appetite, or I think they are the best I ever tasted.

ORN.—They are good ; but I have tasted better.

HAL.—Where ?

ORN.—On the continent ; where the common snipe, that rests during its migration from the north to the south in the marshes of Italy and Carniola, and the double or solitary snipe, become so fat, as to resemble that bird, which was formerly fattened in Lincolnshire, the ruff ; and they have, I think, a better flavour from being fed on their natural food.

HAL.—At what time have you eaten them ?

ORN.—I have eaten them, both in spring and autumn ; but the autumnal birds are the best, and are like the ortolan of Italy.

HAL.—Where does the double snipe winter ?

ORN.—I believe in Africa and Asia Minor. They are rarely seen in England, except driven by an east wind in the spring, or a strong north wind in the autumn. Their natural progress is to and from Finland and Siberia, through the continent of Europe, to and from the east and south.* In autumn they pass more

* From the food, and the remains of food, found in the stomach of the double snipe, I think I have ascertained that it requires a kind of worm, which is not found in winter, even in the temperate climes of Europe ; and that it feeds differently from the snipe. There are certainly none found after the end of October in either Illyria or Italy ; and I believe the same may be said of the end of May, as to their summer migration, or their breeding migration. I have opened the stomachs of at least a dozen of these birds, and their contents were always of the same kind, long, slender, white hexapode larvæ, or their skins, of different sizes, from that of the maggot of the horse-fly, to one thrice as long. In the stomach of the common snipe, which is stronger and larger, I have generally found earth-worms, and often seeds, and rice, and gravel. I conjecture that, in the temperate climates of Europe, most of the aquatic

east, both because they are aided by west winds, and because the marshes in the east of Europe, are wetter in that season ; and in spring they return, but the larger

larvæ, on which the solitary snipe feeds, are converted into flies in the spring and autumn, which probably limits the period of their migration. In 1827, the solitary snipe passed through Italy and Illyria, between the 15th of March and the 6th of May. I heard of the first at Ravenna the 17th of March, and I shot two near Laybach, on the 5th of May ; but though I was continually searching for them for a fortnight after, I found no more. This year they returned from the north early : and I saw some in the marshes of Illyria, on the 19th of August. In 1828, they were later in their vernal passage, and likewise in their return. I found them in Illyria through May, as late as the 17th, on which day I shot three ; and they did not re-appear till the beginning of September. I found one on the 3rd, and three on the 4th,—and twenty were shot on the 7th.

As this bird is rarely seen in England, I shall mention its peculiarities. It is more than one-third larger than the common snipe, and has a breast spotted with gray feathers. Its beak is shorter than that of the snipe ; the old ones have feathers almost pure white in their tails,—and as they spread them when rising, they are easily distinguished by this character from the snipe ; but in the young birds that I have seen in August, this character was wanting. They are usually very fat, particularly the young birds ; their weight varies from six to nine ounces ; but even the fattest ones are rarely above seven ounces and a half ; and though I have killed more than a hundred, I can speak of half-a-dozen only that weighed above eight ounces and a half. In spring they are usually found in pairs ; the female being rather larger, and having a paler breast : in autumn they are solitary. They prefer wet meadows to bogs, or large, deep marshes. They usually lie closer than snipes, and seldom fly far. Their flight is straight, like that of a jack snipe ; and they are easily shot.

Attention to the migrations of birds, might, I have no doubt, lead to important indications respecting the character and changes of the weather and seasons. The late migration of the solitary snipe, this year (1828), seems to have been an indication of a wet and backward summer in the north of Europe. But to form opinions upon facts of this kind, requires much knowledge and caution. The perfection of the peculiar larvæ on which this snipe feeds, depends upon a number of circumstances ; the temperature of the last year ; the period when the eggs were laid ; the heat of the water when they were deposited ; and the quantity of rain since. The migration of the solitary snipe, is only one

proportion through Italy, where they are carried by the *Sirocco*, and which at that time is *extremely wet*. Come, let us have another bottle of claret: a pint per man, is not too much after such a day's fatigue.

link in a great chain of causes and effects, all connected, and extending from Africa to Siberia.

I shall say a few words on the congeners of this bird (the solitary snipe) and on the three varieties so much better known in Europe. The woodcock feeds indiscriminately upon earthworms, small beetles, and various kinds of larvæ; and its stomach sometimes contains seeds, which I suspect have been taken up in boring amongst the excrements of cattle; yet the stomach of this bird has something of the gizzard character, though not so much as that of the land-rail, which I have found half filled with seeds of grasses, and even containing corn, mixed with May-bugs, earthworms, grasshoppers, and caterpillars. The woodcock, I believe, breeds habitually only in high northern latitudes; yet there are woods in England, particularly one in Sussex, near the borders of Hampshire, in which one or two couple of these birds, it is said, may always be found in summer. I suspect these woodcocks are from the offspring of birds which had paired for their passage, and which were detained by an accident happening to one of them, and which staid and raised a young brood in England; and the young ones probably had their instincts altered by the accidents of their being born in England, and being in a place well supplied with food. It is not improbable, that they raised likewise young ones, and that the habit of staying has become hereditary. There can be no doubt that woodcocks are very constant to their local attachments; woodcocks, that have been preserved in a particular wood for a winter, always return to it, if possible, the next season. Many woodcocks breed in Norway and Sweden, in the great, extensive, and moist pine woods, filled with bogs and morasses, which cover these wild countries, but probably a still greater number breed further north, in Lapland, Finland, Russia, and Siberia. It is, I believe, a fable, that they ever raise their young habitually in the high Alpine or mountainous countries, of the central or southern parts of Europe. These countries, indeed, in summer, are very little fitted for their feeding; they cannot bore, where it is either dry or frosty; and the glacier, or the arid sand or rock, are equally unfitted for their haunts. They leave the north with the first frost, and travel slowly south, till they come to their accustomed winter quarters; they do not usually make a quick voyage, but fly from wood to wood, reposing and feeding on their journey: they prefer for their haunts, woods near marshes or morasses; they hide them-

HAL.—You have made me president for these four days, and I forbid it. A half pint of wine for young

selves under thick bushes in the day, and fly abroad to feed in the dusk of the evening. A laurel, or a holly-bush is a favourite place for their repose: the thick and varnished leaves of those trees prevent the radiation of heat from the soil, and they are less affected by the refrigerating influence of a clear sky, so that they afford a warm seat for the woodcock. Woodcocks usually begin to fly north on the first approach of spring, and their flights are generally longer, and their rests fewer, at this season than in the autumn. In the autumn they are driven from the north to the south by the want of food, and they stop wherever they can find food. In the spring, there is the influence of another powerful instinct added to this, the sexual feeling. They migrate in pairs, and pass as speedily as possible to the place where they are likely to find food, and to raise their young, and of which the old birds have already had the experience of former years. Scarcely any woodcocks winter in any part of Germany. In France there are a few found, particularly in the southern provinces, and in Normandy and Brittany. The woods of England, particularly of the west and south, contain always a certain quantity of woodcocks, but there are far more in the moist soil and warmer climate of Ireland; but in the woods of southern Italy and Greece, near marshes, they are far more abundant; and they extend in quantities over the Greek Islands, Asia Minor, and northern Africa.

The snipe is one of the most generally distributed birds belonging to Europe. It feeds upon almost every kind of worm, or larvæ, and, as I have said before, its stomach sometimes contains seeds and rice; it prefers a country cold in the summer to breed in; but wherever there is much fluid water, and great morasses, this bird is almost certain to be found. Its nest is very inartificial, its eggs large, and the young ones soon become of an enormous size, being, often before they can fly, larger than their parents. Two young ones are usually the number in a nest, but I have seen three. The old birds are exceedingly attached to their offspring, and if any one approaches near the nest they make a loud and drumming noise above the head, as if to divert the attention of the intruder. A few snipes always breed in the marshes of England and Scotland, but a far greater number retire for this purpose to the Hebrides and the Orkneys. In the heather surrounding a small lake in the island of Hoy, in the Orkneys, I found in the month of August, 1817, the nest of ten or twelve couple of snipes. I was grouse-shouting, and my dog continually pointed them, and, as there were sometimes three young ones and two old ones in the nest, this had a most powerful scent. From accident of the season these snipes were very late in being hatched, for they usually fly before the

men in perfect health is enough, and you will be able to take your exercise better, and feel better for this abstinence. How few people calculate upon the effects of constantly renewed fever, in our luxurious system of

middle of July ; but this year, even as late as the 15th of August, there were many young snipes that had not yet their wing feathers. Snipes are usually fattest in frosty weather, which, I believe, is owing to this, that in such weather they haunt only warm springs, where worms are abundant, and they do not willingly quit these places, so that they have plenty of nourishment and rest, both circumstances favourable to fat. In wet open weather they are often obliged to make long flights, and their food is more distributed. The jack-snipe feeds upon smaller insects than the snipe : small white larvæ, such as are found in black bogs, are its favourite food, but I have generally found seeds in its stomach, once hemp-seeds, and always gravel. I know not where the jack-snipe breeds, but I suspect far north. I never saw their nest or young ones in Germany, France, Hungary, Illyria, or the British Islands. The common snipe breeds in great quantities in the extensive marshes of Hungary and Illyria ; but I do not think the jack-snipe breeds there, for, even in July and August, with the first very dry weather, many snipes, with ducks and teal, come into the marshes in the south of Illyria, but the jack-snipe is always later in its passage, later even than the double snipe, or the woodcock. In 1828, in the drains about Laybach, in Illyria, common snipes were seen in the middle of July. The first double snipes appeared the first week in September, when likewise woodcocks were seen ; the first jack-snipe did not appear till more than three weeks later, the 29th of September. I was informed at Copenhagen, that the jack-snipe certainly breeds in Zeeland, and I saw a nest with its eggs, said to be from the island of Sandholm, opposite Copenhagen, and I have no doubt that this bird and the double snipe sometimes make their nests in the marshes of Holstein and Hanover. An excellent sportsman and good observer informs me, that, in the great royal decoy, or marsh preserve, near Hanover, he has had ocular proofs of double-snipes being raised from the nest there ; but these birds require solitude and perfect quiet, and, as their food is peculiar, they demand a great extent of marshy meadow. Their stomach is the thinnest amongst birds of the scolopax tribe, and, as I have said before, their food seems to be entirely larvæ of a particular kind.

[These larvæ, according to an able naturalist, who examined them at Rome, appear to be of *Eporris cincta* (Bonelli), *carabus cinctus*, *aurantorum*.]

living in England! The heart is made to act too powerfully, blood is thrown upon the nobler parts, and, with the system of wading adopted by some sportsmen, whether in shooting or fishing, is delivered either to the hemorrhoidal veins, or, what is worse, to the head. I have known several free livers, who have terminated their lives by apoplexy, or have been rendered miserable by palsy, in consequence of the joint effects of cold feet and too stimulating a diet; that is to say, as much animal food as they could eat, with a pint or perhaps a bottle of wine per day. Be guided by me, my friends, and neither drink nor wade. I know there are old men who have done both, and have enjoyed perfect health; but these are *devil's decoys* to the unwary, and ten suffer for for one that escapes. I could quote you an instance from this very county, in one of the strongest men have ever known. He was not intemperate, but he lived luxuriously, and waded as a salmon fisher for many years in this very river; but before he was fifty, palsy deprived him of the use of his limbs, and he is still a living example of the danger of the system which you are ambitious of adopting.

ORN.—Well, I give up the wine, but I intend to wade in Hancock's boots to-morrow.

HAL.—Wear them, but do not wade in them. The feet must become cold in a stream of water constantly passing over the caoutchouc and leather, notwithstanding the thick stockings. They are good for keeping the feet warm, and I think where there is exercise, as in snipe shooting, they may be used without any bad effects. But I advise no one to stand still (which an angler must do sometimes) in the water, even with these ingenious water-proof inventions. All anglers should remember old Boerhaave's maxims of health, and act

upon them : “ Keep the feet warm, the head cool, and the body open.”

PHYS.—I am sorry we did not examine more minutely the weight and size of the fish we caught, and compare the anatomy of the salmon and the sea trout ; but we were in too great a hurry to see them on the table, and our philosophy yielded to our hunger.

HAL.—We shall have plenty of opportunities for this examination ; and we can now walk down to the fishing-house and see probably half a hundred fish of different sizes, that have been taken in the cruives, this evening, and examine them at our leisure.

ALL.—Let us go !

PHYS.—I never saw so many fish of this kind before ; and I conclude that heap of smaller fish is composed of trout.

HAL.—Certainly. Let us compare one of the largest trout with a salmon. I have selected two fresh-run fish, which, from their curved lower jaws, are I conclude, both males. The salmon, you see is broader, has a tail rather more forked, and the teeth in proportion are rather smaller. The trout, likewise, has larger and more black brown spots on the body ; and the head of the trout is a little larger in proportion. The salmon has 14 spines in the pectoral fins, 10 in each of the ventral, 13 in the anal, 21 in the caudal, and 15 in the dorsal. The salmon measures $38\frac{1}{2}$ inches in length, and 21 inches in girth, and his weight, as you see, is $22\frac{1}{4}$ lbs. The trout has one spine less in the pectoral, and two less in the anal fin, and measures $30\frac{1}{4}$ inches in length, 16 inches in girth, and his weight is 11 lbs. We will now open them. The stomach of the salmon, you per-

ceive, contains nothing but a little yellow fluid, and though the salmon is twice as large, does not exceed much in size that of the trout. The stomach of the trout, unlike that of the salmon, will be found full of food: we will open it. See, there are half-digested sand eels which come out of it.

PHYS.—But surely the stomachs of salmon must sometimes, when opened, contain food?

HAL.—I have opened ten or twelve, and never found any thing in their stomachs but tape-worms, bred there, and some yellow fluid; but, I believe, this is generally owing to their being caught at the time of migration, when they are travelling from the sea upwards, and do not willingly load themselves with food. Their digestion appears to be very quick, and their habits seem to show, that after having taken a bait in the river they do not usually seek another till the work of digestion is nearly performed: but when they are taken at sea, and in rivers in the winter, food, I am told, is sometimes found in their stomachs.* The sea-trout is a much more voracious fish, and, like the land trout, is not willingly found with an empty stomach.

PHYS.—I presume the sea trout is the fish called by Linnæus, in his Fauna, *Salmo Eriox*?

HAL.—I know not: but I should rather think that fish a variety of the common salmon.

PHYS.—But there are surely other species of salmon, that live in the sea and come into our rivers: I have

* [An angler has assured me, that he has found the common earth-worm in the stomach of a salmon of the Tay: in the sea, the sand-eel, there is reason to believe, is its favourite food. It has been maintained that the ova of various kinds of ecchinodermata and of certain crustacea are its sole food, and that its good qualities for the table depend on this delicate diet; but the strength of its teeth and their size, cannot be considered favourable to this opinion.]

heard of fish called *grays*, *bull-trout*, *scurfs*, *morts*, *peales*, and *whitlings*.

HAL.—I have never been able to identify more than the *salmo salar*, or salmon, and *salmo trutta*, or sea-trout, in the rivers of Great Britain or Ireland. The whitlings I believe to be the young of the sea-trout. A sea-trout which I saw in Ireland, called a bull-trout, was of the same kind as you see here; but fresh-water trout are sometimes carried in floods to the sea, and come back larger and altered in colour and form, and are then mistaken for new species: and as each river possesses a peculiar variety belonging to it, this, with differences depending upon food and size, will, I think, account for the peculiarities of particular fish, without the necessity of supposing them distinct species. I remember, many years ago, the first time I ever fished for salmon in spring in the Tweed, I caught with the fly, one fine morning in March, two fish nearly of the same length: one was a male of the last season that had lost its milt; the other a female fresh from the sea. They were so unlike, that they did not appear of the same species: the spent or kipper salmon was long and lean, showing an immense head, spotted all over with black and brown spots, and the belly almost black; the other bright and silvery, without spots, and the head small. Even the pectoral and anal fins had more spines in the newly run fish, some of the smaller ones having been probably rubbed off in spawning by the other. I would not for some time, till assured by an experienced fisherman, believe, that the spent fish *was* a salmon; and when their flesh was compared on the table, one was white, flabby, and bad, and without curd; the other of the brightest pink, and full of dense curd. Then, though of the same length, one weighed only 4 lbs., the other $9\frac{1}{2}$ lbs. When it is

recollected that different salmon and sea-trout spawn at different times in the same river, and that fish of the same year, being born at different seasons, from Christmas to Lady-day,—and having migrated to the sea in spring—run up the rivers of all sizes in summer and autumn—the young salmon from 2 to 10 lbs. in weight, the young sea-trout from $\frac{1}{2}$ to 3 lbs. in weight—it is not difficult to account for the variety of names given by casual observers to individuals of these two species. But I must not forget my promise of sending a fish to the Highlander, with whose sport we have interfered. There is a good salmon, which shall be taken to him immediately, and for which I shall pay the tacksman his usual price of 5*d.* per pound.

FIFTH DAY.

HALIEUS—POIETES—ORNITHER—PHYSICUS.

Morning.

HAL.—WELL, is your tackle all ready? It is a fine fresh and cloudy morning, with a gentle breeze—a day made for salmon fishing.

[*They proceed to the river.*]

HAL.—Now, my friends, I give up the two best pools to you till one o'clock; and I shall amuse myself above and below—probably with trout fishing. As there is a promise of a mixed day, with—what is rare in this country—a good deal of sunshine, I will examine your flies a little, and point out those I think likely to be useful; or rather, I will show you my flies, and, as you all have duplicates of them, you can each select the fly

which I point out, and place it in a part of the book where it may easily be found. First: when the cloud is on, I advise the use of one of these three golden twisted flies, with silk bodies, orange, red and pale blue, with red, orange, and gray hackle, golden pheasant's hackle for tail, and kingfisher's blue, and golden pheasant's brown hackle under the wing; beginning with the brightest fly, and changing to the darker one. Should the clouds disappear, and it become bright, change your flies for darker ones, of which I will point out three:—a fly with a brown body and a red cock's hackle, one with a dun body and black hackle and light wing, and one with a black body, a hackle of the same colour, and a brown mallard's wing. All these flies have, you see, silver twist round their bodies, and all kingfisher's feather under the wing, and golden pheasant's feather for the tail. For the size of your flies, I recommend the medium size, as the water is small to-day; but try all sizes, from the butterfly size, of a hook of half an inch in width, to one of a quarter. Now Physicus, cast your orange fly into that rapid at the top of the pool; I saw a large fish run there this moment. You fish well, were common trout your object; but, in salmon fishing, you must alter your manner of moving the fly. It must not float quietly down the water; you must allow it to sink a little, and then pull it back by a gentle jerk—not raising it out of the water,—and then let it sink again, till it has been shown in motion, a little below the surface, in every part of your cast. That is right,—he has risen.

PHYS.—I hold him. He is a noble fish!

HAL.—He is a large grilse, I see by his play; or a young salmon of the earliest born this spring. Hold him tight; he will fight hard.

PHYS.—There! he springs out of the water! Once, twice, thrice, four times! He is a merry one!

HAL.—He runs against the stream, and will soon be tired,—but do not hurry him. Pull hard now, to prevent him from running round that stone. He comes in. I will gaff him for you. I have him! A goodly fish of this tide. But see, Poietes has a larger fish at the bottom of the great pool, and is carried down by him almost to the sea.

POIET.—I cannot hold him! He has run out all my line.

HAL.—I see him: he is hooked foul, and I fear we shall never recover him, for he is going out to sea. Give me the rod,—I will try and turn him; and do you run down to the entrance of the pool, and throw stones, to make him, if possible, run back. Ay! that stone has done good service; he is now running up into the pool again. Now call the fisherman, and tell him to bring a long pole, to keep him if possible, from the sea. You have a good assistant, and I will leave you, for tiring this fish will be at least a work of two hours. He is not much less than 20 lbs. and is hooked under the gills, so that you cannot suffocate him by a straight line. I wish you good fortune; but should he turn sulky, you must not allow him to rest, but make the fisherman move him with the pole again; your chance of killing him depends upon his being kept incessantly in action, so that he may exhaust himself by exercise. I shall go and catch you some river trout for your dinner;—but I am glad to see, before I take my leave of you, that Ornither has likewise hold of a fish,—and, from his activity, a lusty sea-trout.

[*He goes, and returns in the afternoon.*]

HAL.—Well, Poietes, I hope to see your fish of 20lbs.

POIET.—Alas! he broke me,—turned sulky, and went to the bottom; and when he was roused again, my line came back without the fly; so that I conclude he has cut my links by rubbing them against some sharp stone. But I have caught two grilse and a sea-trout since, and lost two others, salmons or grilse, that fairly got the hooks out of their mouths.

HAL.—And, Ornither, what have you done? Well, I see,—a salmon, a grilse, and a sea-trout. And, Physicus?

PHYS.—I have lost three fish; one of which broke me, at the top of the pool, by running amongst the rocks; and I have only one small sea-trout.

HAL.—Your fortune will come another day. Why, you have not a single crimped fish for dinner, and it is now nearly two o'clock; and you have been catching for the picklers, for those fish may all go to the boiling-house. I must again be your purveyor. Can you point out to me any part of this pool where you have not fished?

ALL.—No.

HAL.—Then I have little chance.

PHYS.—O yes! you have a charm for catching fish.

HAL.—Let me know what flies you have tried, and I may perhaps tell you if I have a chance. With my small bright humming bird, as you call it, I will make an essay.

POIET.—But this fishery is really very limited; and two pools for four persons a small allowance.

HAL.—If you could have seen this river twenty years ago, when the cruives were a mile higher up, then you might have enjoyed fishing. There were eight or ten pools, of the finest character possible for angling, where a fisherman of my acquaintance has hooked thirty fish

in a morning. The river was then perfect, and it might easily be brought again into the same state ; but even as it is now, with this single good pool and this second tolerable one, I know no place where I could, in the summer months, be so secure of sport as here—certainly no where in Great Britain.

POIET.—I have often heard the Tay and the Tweed vaunted as salmon rivers.

HAL.—They were good salmon rivers, and are still very good, as far as the profit of the proprietor is concerned : but, for angling, they are very much deteriorated. The net fishing, which is constantly going on, except on Sundays and in close time, suffers very few fish to escape ; and a Sunday's flood offers the sole chance of a good day's sport, and this only in particular parts of these rivers. I remember the Tweed and the Tay in a far better state. The Tweed, in the late Lord Somerville's time, always contained taking-fish after every flood in the summer. In the Tay, only ten years ago, at Mickleure, I was myself one of two anglers who took eight fine fish,—three of them large salmon,—in a short morning's fishing : but now, except in spring fishing, when the fish are little worth taking, there is no certainty of sport in these rivers ; and one, two, or three fish (which last is of rare occurrence), are all even an experienced angler can hope to take in a day's skilful and constant angling.

POIET.—You have fished in most of the salmon rivers of the north of Europe,—give us some idea of the kind of sport they afford.

HAL.—I have fished in some, but perhaps not in the best ; for this it is necessary to go into barbarous countries—Lapland, or the extreme north of Norway ; and I have generally loved too much the comforts of life to

make any greater sacrifices than such as are made in our present expedition. I have heard the river at Drontheim boasted of as an excellent salmon river, and I know two worthy anglers who have tried it; but I do not think they took more fish in a day than I have sometimes taken in Scotland and Ireland. All the Norwegian rivers that I tried (and they were in the south of Norway) contained salmon. I fished in the Glommen, one of the largest rivers in Europe; in the Mandals, which appeared to me the best fitted for taking salmon; the Arrendal and the Torrisdale;—but, though I saw salmon rise in all these rivers, I never took a fish larger than a sea-trout; of these I always caught many—and even in the *fiords*, or small inland salt-water bays; but I think never any one more than a pound in weight. It is true, I was in Norway in the beginning of July, in exceedingly bright weather, and when there was no night; for even at twelve o'clock the sky was so bright, that I read the smallest print in the columns of a newspaper. I was in Sweden later—in August: I fished in the magnificent Gotha, below that grand fall Trolhetta, which to see is worth a voyage from England; but I never raised there any fish worth taking: yet a gentleman from Gothenburg told me he had formerly taken large trout there. I caught, in this noble stream, a little trout about as long as my hand; and the only fish I got to eat at Trolhetta was bream. The Falkenstein, a darker water, very like a second-rate Scotch river—say the Don—abounds in salmon; and there I had a very good day's fishing. I took six fish, which gave me great sport; they were grilses, under 6 lbs.; but I lost a salmon, which I think was above 10 lbs. This river, I conceive, must be, generally, excellent; it is not covered with saw-mills, like most of the Norwegian rivers; its

colour is good, and it is not so clear as the rivers of the south of Norway.

PHYS.—Do you think the saw-mills hurt the fishing?

HAL.—I do not doubt it. The immense quantity of sawdust which floats in the water, and which forms almost hills along the banks, must be poisonous to the fish by sometimes choking their gills, and interfering with their respiration. I have never fished for salmon in Germany. The Elbe and the Weser, when I have seen them, were too foul for fly-fishing; and in the Rhine, in Switzerland, and its tributary streams, I have never seen a salmon rise. I once hooked a fish, under the fall at Schaffhausen, which in my youthful ardour I thought was a salmon, but it turned out to be an immense chub—a villanous and provoking substitute. And our islands, as far as I know, may claim the superiority over all other lands for this species of amusement. In England it is, however, a little difficult to get a day's salmon fishing. The best river I know of is the Derwent, that flows from the beautiful lake of Keswick; and I caught once, in October, a very large salmon there, and raised another; but it is only late in the autumn that there is any chance of sport, though I have heard the spring salmon fishing boasted of. At Whitwell in the Hodder, I have heard of salmon and sea-trout being taken—but I have never fished in that river. The late Lord Bolingbroke caught many salmon at Christchurch; but a fish a week is as much as can be expected in that beautiful, but scantily stocked, river. Small salmon and sea-trout, or *sewens*, as they are called in the country, may be caught, after the autumnal floods, I believe, in most of the considerable Welsh, Devonshire, and Cornish streams; but I have fished in many of them without success. The Conway I may

except: this river, in the end of October, will sometimes, after a great flood, furnish a good day's sport, and, if the net fishers could be set aside, several days' sport. I have known two salmon, one above 20 lbs., taken here in a day; and I have taken myself fine sea-trout, or *sewens*,—which, in an autumnal flood in Wales, are found in most of the streams near the sea.

POIET.—I have heard a Northumberland man boast of the rivers of that county, as affording good salmon fishing.

HAL.—I have no doubt that salmon are sometimes caught in the Tyne, the Coquet, and the Till; but, in the present state of these rivers, this is a rare occurrence. I was once, for a week, on a good run of the North Tyne; I fished sometimes, but I never saw a salmon rise; and the only place in this river, where, from my own knowledge, I can assert salmon have been caught with the artificial fly, was at Mounsey, very high up the river. There, in 1820, two grilse were caught, in the end of August. I have recorded this, as a sort of historical occurrence; and I dare say, most of the counties of England, in which there are salmon rivers, would, upon a minute inquiry, furnish such instances, if they contained salmon fishers. Yorkshire, Devonshire, and Cornwall, with the sea on both sides, ought to furnish a greater number.

PHYS.—Give us some little account of the Scotch and Irish rivers.

HAL.—I fear I shall tire you, by attempting any details on this subject; for they are so many, that I ought to take a map in my hands; but I will say a few words on those in which I have had good sport. First, the Tweed:—of this, as you will understand from what I mentioned before, I fear I must now say "*fruit*." Yet

still, for spring salmon fishing, it must be a good river. The last great sport I had in that river, was in 1817, in the beginning of April. I caught, in two or three hours, at Merton, four or five large salmon, and as many in the evening at Kelso; and one of them weighed 25 lbs. But this kind of fishing cannot be compared to the summer fishing: the fish play with much less energy, and in general are in bad season; and the fly used for fishing, is almost like a bird—four or five times larger than the summer fly—and the coarsest tackle may be employed. I have heard that Lord Home has sometimes taken thirty fish in a day, in spring fishing. About, and above Melrose, I have taken, in a morning in July, two or three grilises; and in September, the same number. I have known eighteen taken earlier, by an excellent salmon fisher, at Merton; and the late Lord Somerville often took six or seven fish in a day's angling. The same "*fruit*" I must apply to most of the Scotch rivers. Of the Tay, I have already spoken. In the Dee, I have never caught salmon, though I have fished in two parts of it, but it was in bad seasons. In the Don, I have seen salmon rise, and hooked one; but never killed a fish. In the Spey I enjoyed one of the best days' sport (perhaps the very best) I ever had in my life: it was in the beginning of September, in close time; the water was low; and as net fishing had been given over for some days, the lower pools were full of fish. By a privilege, which I owed to the late Duke of Gordon, I fished at this forbidden time, and hooked twelve or thirteen fish in one day. One was above 30 lbs.; but it broke me, by the derangement of my reel I landed seven or eight—one above 20 lbs., which gave me great play in the rapids above the bridge. I returned to the same spot in 1813, the year after: the river was

in excellent order, and it was the same time of the year, but just after a flood,—I caught nothing; the fish had all run up the river; the pools, where I had such sport the year before, were empty. I have fished there since, with a like result; but this was before the 12th of August, the close day. In the Sutherland and Caithness rivers, many salmon, I have no doubt, may still be caught. The Brora, Sutherland, in 1813 and 1814, was an admirable river: I have often rode from the mansion of the princely and hospitable lord and lady of that county, after breakfast, and returned at two or three o'clock, having taken from three to eight salmon—several times eight. There were five pools below the weirs of the Brora, which always contained fish; and at the top of one pool, which, from its size was almost inexhaustible, I have taken three or four salmon the same day. Another pool, nearer the sea, was almost equal to it; and at that time I should have placed the Brora above the Ewe for certainty of sport. When I fished there last, in 1817, the case was altered, and I caught only two or three fish in the very places where I had six years before been so successful. In the Helmsdale there are some good pools; and I have caught fine fish there when the river has been high. I have fished in the river at Thurso, but without success; it was always foul when I made my attempt. I have heard of a good salmon river in Lord Reay's country, the Laxford: its name, of Norwegian origin, would seem to be characteristic.* Along the coast of Scotland most of the streams, if taken at the right time, afford sport. In this county the Beaully is a good river; and I have caught salmon in that very beautiful spot below the falls of Kilmornack. The Ness, at Inverness, and the Awe and Lochy, I have

* *Lax* is the Teutonic word for salmon.

fished in, but without success. I may say the same of the Ayr, and of the rivers which empty themselves into the Solway Frith. A little preserved stream, at Ardgowan, was formerly excellent, after a flood in September, for sea-trout; and later for salmon: I have had good sport there; and some of my friends have had better.

In Ireland there are some excellent rivers; and, what you will hardly believe possible, comparing the characters of the two nations, some of them are taken better care of than the Scotch rivers; which arises a good deal from the influence of the Catholic priests, when they are concerned in the interests of the proprietors, on the Catholic peasantry. I should place the Erne, at Ballyshannon, as now the first river for salmon fishing from the banks with a rod, in the British dominions; and the excellent proprietor of it, Dr. Shiel, is liberal and courteous to all gentlemen fly-fishers. The Moy, at Balina, is likewise an admirable salmon river; and sport, I believe, may almost always be secured there in every state of the waters; but the best fishing can only be commanded by the use of a boat. I have taken in the Erne two or three large salmon in the morning; and in the Moy, three or four grilses, or, as they are called in Ireland, *grauls*: and this was in a very bad season for salmon fishing. The Bann, near Coleraine, abounds in salmon; but, in this river, except in close time, when it is unlawful to fish there, there are few good casts. In the Bush, a small river about seven miles to the east of the Bann, there is admirable salmon fishing, always after great floods; but in fine and dry weather, it is of little use to try. I have hooked twenty fish in a day, after the first August floods, in this river; and, should sport fail, the celebrated Giant's Causeway is within a mile of

its mouth, and furnishes to the lovers of natural beauty, or of geological research, almost inexhaustible sources of interest. The Blackwater, at Lismore, is a very good salmon river: and the Shannon, above Limerick, and at Castle Connel, whenever the water is tolerably high, offers many good casts to the fly-fisher; but they can only be commanded by boats. But there is no considerable river along the northern or western coast,—with the exception of the Avoca, which has been spoiled by the copper mines,—that does not afford salmon; and if taken at the proper time, offer sport to the salmon fisher. But it is time for us to return to our inn.

THE INN.

POIET.—Should it be a fine day to-morrow, I think we shall have good sport: the high tide will bring up fish, and the rain and wind of yesterday will have enlarged the river.

HAL.—To-morrow we must not fish: it is the Lord's day, and a day of rest. It ought, likewise, to be a day of worship and thanksgiving to the Great Cause of all the benefits and blessings we enjoy in this life, for which we can never sufficiently express our gratitude.

POIET.—I cannot see what harm there can be in pursuing an amusement on a Sunday, which you yourself have called innocent, and which is apostolic: nor do I know a more appropriate way of returning thanks to the Almighty Cause of all being, than in examining and wondering at his works in that great temple of nature, whose canopy is the sky: and where all the beings and elements around us are, as it were, proclaiming the power and wisdom of Deity.

HAL.—I cannot see how the exercise of fishing can add to your devotional feelings; but, independent of

this, you employ a servant to carry your net and gaff,—and he, at least, has a right to rest on this one day. But even if you could perfectly satisfy yourself as to the abstracted correctness of the practice, the habits of the country in which we now are, form an insurmountable obstacle to the pursuit of the amusement: by indulging in it, you would excite the indignation of the Highland peasants, and might perhaps expiate the offence, by a compulsory ablution in the river.

POIET.—I give up the point: I make it a rule never to shock the prejudices of any person, even when they appear to me ridiculous; and I shall still less do so in a case where your authority is against me; and I have no taste for undergoing persecution, when the cause is a better one. I now remember that I have often heard of the extreme severity with which the Sabbath discipline is kept in Scotland. Can you give us the reason of this?

HAL.—I am not sufficiently read in the Church History of Scotland, to give the cause historically; but I think it can hardly be doubted, that it is connected with the intense feelings of the early Covenanters, and their hatred with respect to all the forms and institutes of the Church of Rome, the ritual of which makes the Sunday more a day of innocent recreation, than severe discipline.

PHYS.—Yet the disciples of Calvin at Geneva, who, I suppose, must have hated the Pope, as much as their brethren of Scotland, do not so rigidly observe the Sunday; and I remember having been invited by a very religious and respectable Genevese to a shooting party on that day.

HAL.—I think climate, and the imitative nature of man, modify this cause abroad. Geneva is a little state,

in a brighter climate than Scotland, almost surrounded by Catholics; and the habits of the French and Savoyards must influence the people. The Scotch, with more severity and simplicity of manners, have no such examples of bad neighbours, for the people of the north of England keep the Sunday much in the same way.

POIET.—Nay, Halieus, call them not bad neighbours; recollect my creed, and respect at least, what, if error, was the error of the western Christian world for 1000 years. The rigid observance of the seventh day, appears to me rather a part of the Mosaic, than of the Christian dispensation. The Protestants of this country consider the Catholics bigots, because they enjoin to themselves, and perform certain penances, for their sins; and surely the Catholics may see a little still resembling that spirit, in the interference of the Scotch in innocent amusements, on a day celebrated as a festive day, that on which our Saviour rose to immortal life, and secured the everlasting hopes of the Christian. I see no reason why this day should not be celebrated with singing, dancing, and triumphal processions, and all innocent signs of gladness and joy. I see no reason why it should be given up to severe and solitary prayers, or to solemn and dull walks; or why, as in Scotland, whistling even should be considered as a crime on Sunday; and humming a tune, however sacred, out of doors, as a reason for violent anger and persecution.

ORN.—I agree with Poietes, in his views of the subject. I have suffered from the peculiar habits of the Scotch church, and therefore may complain. Once in the north of Ireland, when a very young man, I ventured after the time of divine service to put together my rods, as I had been used to do in the Catholic districts of Ireland, and fish for sea-trout in the river at Rath-

melton, in pure innocence of heart, unconscious of wrong, when I found a crowd collect round me—at first I thought from mere curiosity, but I soon discovered I was mistaken; anger was their motive, and vengeance their object. A man soon came up exceedingly drunk, and began to abuse me by various indecent terms: such as a Sabbath-breaking Papist, &c. It was in vain I assured him I was no Papist, and no intentional Sabbath breaker; he seized my rod and carried it off with imprecations; and it was only with great difficulty that I recovered my property. Another time I was walking on Arthur's Seat, with some of the most distinguished professors of Edinburgh attached to the geological opinions of the late Dr. Hutton; a discussion took place upon the phenomena presented by the rocks under our feet, and, to exemplify a principle, Professor Playfair broke some stones, in which I assisted the venerable and amiable philosopher. We had hardly examined the fragments, when a man from a crowd, who had been assisting at a field preaching, came up to us and warned us off, saying, "Ye think ye are only stane breakers; but I ken ye are Sabbath breakers, and ye deserve to be staned with the stanes ye are breaking!"

HAL.—Zeal of every kind is sometimes troublesome, yet I generally suspect the persons, who are *very* tolerant, of scepticism. Those who firmly believe that a particular plan of conduct is essential to the eternal welfare of man, may be pardoned if they show even *anger*, when this conduct is not pursued. The severe observance of the Sabbath, is connected with the vital creed of these rigid Presbyterians; it is not, therefore, extraordinary, that they should enforce it, even with a perseverance that goes beyond the bounds of good manners and courtesy. They may quote the example of our

Saviour, who expelled the traders from the temple, even by violence.

PHYS.—I envy no quality of the mind or intellect in others; be it genius, power, wit or fancy: but if I could choose what would be most delightful, and I believe most useful to me, I should prefer a firm religious belief to every other blessing; for it makes life a discipline of goodness; creates new hopes, when all earthly hopes vanish; and throws over the decay, the destruction of existence, the most gorgeous of all lights; awakens life, even in death,—and from corruption and decay calls up beauty and divinity; makes an instrument of torture and of shame, the ladder of ascent to paradise; and, far above all combinations of earthly hopes, calls up the most delightful visions of palms and amaranths, the gardens of the blest, the security of everlasting joys, where the sensualist and the sceptic view only gloom, decay, annihilation, and despair!

POIET.—You transiently referred, Haleius, yesterday, to that instinct of salmons which induces them to run up rivers from the sea on the approach of rain. You have had so many opportunities of attending to the instincts of the inferior animals, that I should be very glad to hear your opinion on that very curious subject, the nature and development of instincts in general.

HAL.—You must remember, that, in the conversation to which you allude, I avoided even to pretend to define the nature of instinct; but I shall willingly discuss the subject; and I expect from yourself, Ornither and Physicus, more light thrown upon it than I can hope to bestow.

ORN.—I believe we have each a peculiar view on this matter. In discussion we may enlighten and correct each other. For myself, I consider instincts merely as

results of organization, a part of the machinery of organized forms. Man is so constituted, that his muscles acquire their power by habit; their motions are at first automatic, and become voluntary by associations, so that a child must learn to walk as he learns to swim or write; but in the colt or chicken, the limbs are formed with the powers of motion; and these animals walk as soon as they have quitted the womb or the egg.

PHYS.—I believe it possible that they may have acquired these powers of motion in the embryo state; and I think I have observed, that birds learn to fly, and acquire the use of their wings, by continued efforts, in the same manner as a child does that of his limbs.

ORN.—I cannot agree with you: the legs of the foetus are folded up in the womb of the mare; and neither the colt nor the chicken can ever have performed, in the embryo state, any motions of their legs similar to those which they have perfectly at their command when born. Young birds cannot fly as soon as they are hatched, because they have no wing feathers; but as soon as these are developed, and even before they are perfectly strong, they use their wings, fly, and quit their nests without any education from their parents. Compare a young quail, when a few days old, with a child of as many months: he flies, runs, seeks his food, avoids danger, and obeys the call of his mother; whilst a child is perfectly helpless, and can perform few voluntary motions, has barely learnt to grasp, and can neither stand nor walk. But to see the most perfect instance of instinct, as contrasted with acquired knowledge, look at common domestic poultry, as soon as they are excluded from the egg: they run round their mother, nestle in her feathers, and obey her call, without education: she leads them to some spot where there is soft earth or

dung, and instantly begins scratching with her feet; the chickens watch her motions with the utmost attention; if an earthworm or larva is turned up, they instantly seize and devour it, but they avoid eating sticks, grass, or straws; and though the hen shows them the example of picking up grain, they do not imitate her in this respect, but for some days prefer ants, or the larvæ of ants to a barley corn. They may have heard the cluck of their mother in the egg, and having felt the warmth of her feathers agreeable, you may consider, *Physicus*, their collecting under her wings, and obeying her call, as an acquired habit. But I will mention another circumstance, where habit or education is entirely out of the question. Does the mother see the shadow of a kite on the ground, or hear his scream in the air, she instantly utters a shrill suppressed cry; the chickens, though born that day, and searching round her with glee and animation for the food which her feet were providing for them, instantly appear as if thunderstruck; those close to her crouch down and hide themselves in the straw; those further off, without moving from the place, remain prostrate; the hen looks upward with a watchful eye; nor do they resume their feeding till they have been called again by the cluck of their mother, and warned that the danger is over.

PHYS.—I certainly cannot explain the acquaintance of the little animals with the note of alarm of the mother, except upon the principle you have adopted; and I fairly own, that their selection of animal food appears likewise instinctive: yet it is possible, that this selection may depend upon some analogy between the smell of these animal matters and the yolk, which was for a long time their food in the egg

ORN.—I find I must multiply examples. Examine

young ducks which have been hatched under a hen; they no sooner quit the shell, than they fly to their natural element, the water, in spite of the great anxiety and terror of their foster-parent, who in vain repeats that sound to which her natural children are so obedient. Being in the water they seize insects of every kind, which they can only know from their instincts to be good for food; and when they are hatched in the May-fly season, they pursue these large ephemeræ with the greatest avidity, and make them their favourite food. It is impossible I think, to explain these facts, except by supposing, that they depend upon feelings or desires in the animals developed with their organs, which are not acquired, and which are absolutely instinctive. I will mention another instance. A friend of mine was travelling in the interior of Ceylon; on the banks of a lake he saw some fragments of the shells of eggs of the alligator, and heard a noise from beneath the sand; his curiosity was excited and he was induced to search below the surface from whence the sound proceeded; he found some young alligators and several eggs which were still entire: he broke the shell of one of them, the young animal which came forth, when touched with a stick assumed a threatening attitude, and bit at the stick with violence; and it made directly for the water, which (though born by the influence of the sunbeams on the burning sand) it seemed to know was its natural and hereditary domain. Here is an animal which, deserted by its parents, and entirely submitted to the mercy of nature and the elements, must die if it had to acquire its knowledge; but all its powers are given, all its wants supplied; and even its means of offence and defence implanted by strong and perfect instincts. I will mention one fact more. Swallows, quails, and many other birds, migrate in large flocks

when their usual food becomes scarce; and in these cases it may be said (I anticipate a remark of Physicus), that the phenomenon depends upon imitation, and that the young birds follow the old ones who have before made the same flight. But I will select the young cuckoo for an unexceptionable example of the instinctive nature of this quality. He is produced from an egg deposited by his mother in the nest of another bird, generally the hedge sparrow. He destroys all the other young ones hatched in the same nest, and is supplied with food by his foster-parent, after he has deprived her of all her natural offspring. Quite solitary, he is no sooner able to fly than he quits the country of his birth, and finds his way, with no other guide than his instinct, to a land where his parents had gone many weeks before him; and he is not pressed to make this migration by want of food, for the insects and grains on which he feeds are still abundant. The whole history of the origin, education, and migration of this singular animal, is a history of a succession of instincts, the more remarkable, because in many respects contrary to the usual order of nature.

PHYS.—I have been accustomed to refer many of the supposed instincts of animals, such as migrations, building nests, and selection of food, to imitation; but, I confess, I cannot explain the last fact you have brought forward on this principle. Pray, Ornither, let me state your view, as I understand it, that we may not differ as to the meaning of language. I conclude you adopt Hartley's view of association, that the motions of the muscles in man are first automatic, and become voluntary by association; and that reason is the application of voluntary motions for a particular end. For instance: a child is not afraid of fire, but, bringing its hand near the

fire, it is burnt, and the convulsion of the muscles produced by the pain ends in removing the hand from the source of pain. These motions by association are made voluntary; and after this experiment he avoids the fire by *reason*, and takes care always to perform those motions which remove his limbs from this destructive agent. But in contrasting instinct with this slow process, you would say, most animals, without having felt the effects of fire, have an innate dread of it; and in the same way, without having been taught, or experienced pleasure or pain from the object, young ducks seek the water, young chickens avoid it: their organs have a fitness or unfitness for certain functions, and they use them for these functions without education. In short, the instinctive application of the organ is independent of experience, and forms part of a train of pure sensations.

ORN.—I have no objection to the statement you make of my view of the subject; but I certainly should give to it a little more refinement and generality. In all the results of reason, ideas are concerned, but never in those of instinct. Without memory there can be no reason; but in instinct nothing can be traced but pure sensation.

POIET.—Though in the animal world no ideas seem connected with instincts, yet they are all intended for specific and intelligent ends. Thus the swallow travels to a country where flies are found; the salmon migrates from the sea to the sources of fresh rivers, where its eggs may receive a supply of aerated water, and without this migration the race would be extinct: and in this way all the instincts of animals may be referred to intelligence, which, though not belonging to the animal, must be attributed to the Divine Mind. Is it not then reasonable to refer instinct to the immediate impulse

of the Author of Nature upon his creatures? His omnipresence and omnipotence cannot be doubted, and to the infinite mind the past, the present, and the future are alike; and creative and conservative power must equally belong to it.

HAL.—That instincts depend upon impulses immediately derived from the Deity is an opinion which, though it perhaps cannot be confuted, yet does not please me so much as to believe them dependent upon the formation of organs, and the result of the general laws which govern the system of the universe; and it is in favour of this opinion that they are susceptible of modifications. Thus, in domesticated animals they are always changed; the turkey and the duck lose their habits of constructing nests, and the goose does not migrate. In supposing them the result of organization and hereditary, they might be expected to be changed by circumstances, as they are actually found to be. Without referring the instincts of animals to the immediate impulse of the Deity, they appear to me to offer the most irresistible and convincing argument that can be brought forward against atheism. They demonstrate combinations, the result of the most refined intelligence, which can only be considered as infinite. Take any one of the lowest class of animals, insects for instance, not only is their organization fitted to all their wants; but their association in society is provided for, and the laws of a perfect social community, as it were, are adopted by beings, that we are sure cannot reason. In the hive bee, for instance, the instinct of the workers leads them to adopt and obey a queen; and if she is taken away from them, or dies, they have the power of raising another from offspring in the cells, by an almost miraculous process: they work under her government

for a common object; they allow males only to exist for a specific purpose and limited time; and under the government of females, who preserve the society, they send forth swarms, which readily place themselves under the protection of man. In the geometrical construction of their cells, the secretion of wax from their bodies, the collecting their food, and the care of the brood, there is a series of results which it requires a strong reason to follow, and which are the consequences of invariable instincts. Bees, since they have been noticed by naturalists, have the same habits, and, as it is probable that there have been many thousand of generations since the creation, it is evident that the instincts of the first bees have been hereditary and invariable in their offspring; and it cannot be doubted, that they do now, as they did four thousand years ago, make some cells in combs larger than others for the purpose of containing the eggs and future grubs of drones, that are to be produced by a grub, which they are educating for a queen bee; and that these cells are connected with the common cells by a series, in which the most exact geometrical laws of transition are observed. An eminent philosopher has deduced an argument in favour of the existence of Deity from the analogy of the universe to a piece of mechanism, which could only be the work of an intelligent mind; but there is this difference: in all the productions of nature, the principle, not only of perfection, but likewise of conservation, is found, marking a species of intelligence and power which can be compared to nothing human. The first created swarm of bees contained beings provided with all the instincts necessary for the perpetual continuance of the species; and some of these instincts can scarcely be understood by man, requiring the most profound geo-

metrical knowledge, even to calculate their results ; and *other instincts* involve what in human society would be the most singular state of policy, combining contrasted moral causes and contradictory interests. It is impossible not to be lost in awe at the contemplation of this chain of facts ; the human mind cannot fail to acknowledge in them the strongest proofs of their being produced by infinite wisdom and unbounded power ; and the devout philosopher can scarcely avoid considering with respect a little insect endowed with faculties producing combinations, which human reason vainly attempts to imitate, and can scarcely understand.

PHYS.—I agree with you, that if instinct be supposed the result of organization, and that the first animal types were so created as to transmit their instincts invariably, generation after generation, it does offer a most triumphant and incontrovertible argument for the existence of an all-powerful intelligent Cause.—Even in the instance which led to this conversation, the instinct which carries salmon from the sea to the sources of rivers, it is only lately philosophers have discovered, that the eggs cannot produce young fishes independent of the influence of air ; and thus an animal goes many hundred miles under the direction of an instinct, the use of which human reason has at length developed, and man is supplied with an abundant food by the result of a combination, in consequence of which a species is preserved.

POIET.—I do not understand, Haleius, your objections to the view I have adopted, which is sanctioned by the authority of a good ethic philosopher, Addison. Allowing the omnipresence and constant power of Deity, I do not see how you can avoid admitting his actual interference in all the phenomena of living nature.

HAL.—As I said before, I cannot *confute* your view ;

but, upon this principle, gravitation and the motion of the planets round the sun, and all the other physical phenomena of the universe, would be owing to the immediate action of the Divinity. I prefer the view, which refers them to motion and properties, the results of general laws impressed on matter by Omnipotence. This view is, I think simpler; but it is difficult to form any distinct opinion on so high and incomprehensible a subject, on which, perhaps, after all, it is wiser to confess our entire ignorance, and to bow down in humble adoration to the one incomprehensible Cause of all being.

POIET.—I agree with you in your last sentence, but I still adhere to my own view, and I hope you will not object to a favourite opinion of mine, that instincts are to animals what revelation is to man, intended to supply wants in their physical constitution, which in man are provided for by reason; and that revelation is to him as an instinct, teaching him what reason cannot—his religious duties, the undying nature of his intellectual part, and the relations of his conduct to eternal happiness and misery.

HAL.—“*Davus sum, non Œdipus.*” I will not attempt to discuss this view of yours, Poietes; but I think I may say, that all the instincts of animals seem to be connected with pleasure or utility; and in man the feeling of love and the gratifying the tastes which approach nearest to instincts, are likewise highly delightful, and perhaps there is no more pleasurable state of the human mind than when, with intense belief, it looks forward to another world and to a better state of existence, or is absorbed in the adoration of the supreme and eternal Intelligence.*

* As man seems in many instances to have profited by his imitations of the instincts of animals, as in building, making caves and subaqueous

SIXTH DAY.

HALIEUS—POIETES—ORNITHER—PHYSICUS.

Morning.

HAL.—WELL met, my friends ! It is a fine warm morning, there is a fresh breeze, the river is in excellent order for fishing, and I trust our good behaviour yesterday will insure us sport to-day. There must be a great many fresh fish in the pool ; and after twenty-four hours' rest, some of those that were indisposed to take on Saturday evening, may have acquired appetite. Prepare your tackle, and begin : but whilst you are preparing, I will mention a circumstance which every accomplished fly-fisher ought to know. You changed your flies on Saturday with the change of weather, putting the dark flies on for the bright gleams of the sun, and the gaudy flies when the dark clouds appeared : now, I will tell you of another principle, which it is as necessary to know as the change of flies for change of weather ; I allude to the different kinds of fly to be used in particular pools, and even in particular parts of pools. You have fished in this deep pool ; and if you were to change it for a shallower one, such as that above, it would be proper to use smaller flies of the same colour : and in a pool still deeper, larger flies ; likewise in the rough rapid at the top, a larger fly may be used than below at the tail of the water : and in the Tweed or Tay, I have often changed my fly thrice in the same pool, and sometimes with success—using three different flies for the top, middle, and bottom. I re-

constructions, like the beaver ; so animals in a state of domestication seem to have made something like an approach towards the imitation of some of the results of human reason.

member, that when I first saw Lord Somerville adopt this fashion, I thought there was fancy in it; but experience soon proved to me how accomplished a salmon fisher was my excellent and lamented friend, and I adopted the lesson he taught me, and with good results, in all bright waters.

POIET.—I will try the correctness of your principle. Look at the fly now on my line; where would you recommend me to cast it?

HAL.—It is a large gaudy fly, and is fit for no part of this pool, except the extremely rough head of the torrent: there I dare say it will take in *this* state of the waters.

POIET.—Good, I hooked a large fish, but, alas! he is off: yet I thought he was fairly caught.

HAL.—The hook, I think, turned round at the moment you struck, and carried off some scales from the outside of his mouth.

POIET.—You are right: see, the scales are on the hook. I cannot raise another fish: I have tried almost all over the pool. I thought I saw a fish rise at the tail of the rapid.

HAL.—You did: he refused the fly. Now put on a fly one-third of the size, and of the same colour, and I think you will hook that fish.

POIET.—I have done so—and he is fast! and a fine fish; I think a salmon.

HAL.—It is a salmon, and one above 10 lbs. Play him with care, and do not let him run into the rough part of the stream, where the large stones are.

POIET.—It is, I think, the most active fish I have yet played with. See how high he leaps! He is making for the sea.

HAL.—Hold him tight, or you will lose him.

POIET.—Fear me not. I trust, in spite of his strength, I shall turn him. You see, I show him the but of the rod, and his force is counterpoised by a very long lever.

HAL.—You do well. But he has made a violent spring, and, I fear, is off.

POIET.—He is !—but not, I think, by any fault of mine : he has carried off something.

HAL.—You played that fish so well, that I am angry at his loss : either the hook, link, or line, failed you.

POIET.—It is the hook, which you see is broken ; and not merely at the barb, but likewise in the shank. What a fool I was ever to use one of these London or Birmingham-made hooks.

HAL.—The thing has happened to me often. I now never use any hooks for salmon fishing, except those which I am sure have been made by O'Shaughnessy, of Limerick ; for even those made in Dublin, though they seldom break, yet they now and then bend ; and the English hooks, made of cast-steel, in imitation of Irish ones, are the worst of all. *There* is a fly nearly of the same colour as that which is destroyed ; and I can tell you, that I saw it made at Limerick by O'Shaughnessy himself, and tied on one of his own hooks. Should you catch with it a fish even of 30 lbs., I will answer for its strength and temper : it will neither break nor bend.

POIET.—Whilst I am attaching your present, so kindly made, to my line, pray tell me how these hooks are made ; for I know you interested yourself in this subject when at Limerick.

HAL.—Most willingly. I have even made a hook, which, though a little inferior in form, in other respects, I think, I could boast as equal to the Limerick ones. The first requisite in hook-making, is to find good malleable iron of the softest and purest kind—such as is

procured from the nails of old horse-shoes. This must be converted by cementation with charcoal into good, soft steel, and that into bars or wires of different thickness for different-sized hooks, and then annealed. For the larger hooks, the bars must be made in such a form as to admit of cutting the barbs; and each piece, which serves for two hooks, is larger at the ends, so that the bar appears in the form of a double pointed spear, three, four, or five inches long: the bars for the finer hooks are somewhat flattened. The artist works with two files; one finer than the other, for giving the point, and polishing the hook,—and he begins by making the barb, taking care not to cut too deep, and filing on a piece of hard wood, such as box-wood, with a dent to receive the bar, made by the edge of the file. The barb being made, the shank is thinned and flattened, and the polishing file applied to it: and by a turn of the wrist round a circular pincers, the necessary degree of curvature is given to it. The hook is then cut from the bar, heated red-hot, by being kept for a moment in a charcoal fire; then plunged, while hot, into cold water; then tempered, by being put on iron, that has been heated in the same fire till it becomes a bright blue,—and, whilst still hot, it is immersed in candle-grease, where it gains a black colour; it is then finished.

PHYS.—Nothing seems simpler than this process. Surely London might furnish manufacturers for so easy a manipulation; and I should think one of our friends, who is so admirable a cutler, might even improve upon the Irish process; at least the tempering might be more scientifically arranged; for instance, by the thermometer, and a bath of fusible metal, the temperature at which steel becomes blue, being 580° Fahr., might be constantly preserved.

HAL.—Habit teaches our Irish artists this point with sufficient precision. We should have such hooks in England, but the object of the fishing-tackle makers is to obtain them cheap, and most of their hooks are made to sell; and good hooks cannot be sold but at a good price.

POIET.—I have heard formerly a good angler complain that the Limerick hooks were too heavy and clumsy. He preferred hooks made at Kendal, in Cumberland.

HAL.—I saw, twenty years ago, hooks far too heavy made at Limerick; but this O'Shaughnessy is, I think, a better maker than his father was; and the curve, and the general form of the hook, is improved. It has now, I think, nearly the best form of a curve for catching and holding, the point protruding a little. The Kendal hook holds well; but is not so readily fixed by the pull in the mouth of the fish. The early Fellows of the Royal Society, who attended to all the useful and common arts, even improved fish-hooks; and Prince Rupert, an active member of that illustrious body, taught the art of tempering hooks to a person of the name of Kirby; under whose name, for more than a century, very good hooks were sold. I shall take a walk towards the lake, to enjoy a view of its cloud-capped mountains, and I hope to find, on my return, that you have all had your satisfaction in a good day's salmon-fishing.

PHYS.—We shall crimp and cool a salmon, if we catch a good one, for our dinner.

HAL.—Do so.

ORN.—But before you leave us, I wish you would be good enough to inform us why the salmon here are so different from those I have seen elsewhere: for instance, some caught in the Alness, in Rosshire, which we saw

in passing round the south coast of Ross. These appear to me thicker and brighter fish; and one that I measured was 30 inches long, and 17 in circumference.

HAL.—I think I have seen broader fish than even those of this river; but the salmon which you happen to remember for comparison, belonged to a small stream, which, I think, in general are thinner and longer, than those in great rivers; and what I mentioned on a former occasion with respect to trout, holds good likewise with regard to salmon; each river has a distinct kind. It is scarcely possible to doubt that the varieties of the salmon, which haunt the sea, come to the same rivers to breed in which they were born, or where they have spawned before. And this could hardly happen, unless they confined their migrations to a certain space in the sea, the boundaries of which may be regarded as the shore, and probably deep water, which may be considered as effectual a limit almost as land; for fish do not willingly haunt *very* deep water, which even in summer is of low temperature, approaching to 40°, and contains little or no vegetable food or insects, which the smaller fishes search for; and the larger fishes follow the smaller. It is, however, possible, that in winter, all fish fond of heat, will seek water rather deeper than in summer; and char and umbla in lakes are usually found in the deepest parts, being fond of *cool* water; and they come to spawn, whenever the shallow water of the lakes becomes cool, in October or November. We cannot judge of the senses of animals that breathe water,—that separate air from water, by their gills; but it seems probable that, as the quality of the water is connected with their life and health, they must be exquisitely sensible to changes in water, and must have similar relations to it, that an animal with the most delicate nasal organs has

to air. A vulture or a dog scents not only particular food and particular game at great distances, but even makes of the smell a kind of language; and I doubt not, that when dogs, that have been blindfolded and carried away from their home, return to it, it is by the sense of smelling; to them each town, lane, or field, must have a particular scent. A case has been related to me of a dog, carried in a covered basket, from Badulla to Kandy, a distance of 30 or 40 miles, over a road he had never travelled before, and who returned to the spot from which he was taken in less than 24 hours, through the wildest parts of the mountainous district of Ceylon. And I have seen even a blind horse, an animal in which the sense of smelling is less acute, evidently find his way by it to his master's house and stable, which was, indeed, near a tan-yard. The state of parts of water, in the sea or great lakes, produced by the impregnations carried down by particular streams, is much more permanent, than a *like state* in air: so that, though the knowledge given by the nasal organs may be more easily communicated at a distance by winds, yet *that* produced by streams on the branchiæ of fishes, is more invariable; and a migratory fish is less likely to be deceived. Yet in great floods, often connected with storms, or violent motion in the waters near the shore, salmon sometimes mistake their river. I remember in this way, owing to a tremendous flood, catching with the fly a large salmon that had mistaken his river, having come into the Bush, near the Giant's Causeway, instead of the Bann. No fish can be more distinct in the same species, than the fish of these two rivers; their length to their girth, being nearly in a ratio of 20 : 9 and 20 : 13.—I am going: good sport to you!

EVENING.

HAL.—I am sure I may congratulate you on your sport; for I see on the bank a fine salmon, three grauls or grilse, and three large sea-trout.

ORN.—You have not seen all, for we have crimped two fish—one a large salmon, and the other a trout almost a yard long, and both in excellent season. We have had great sport, and sport even of a kind which you will not guess at; for, when the tide was falling, the fish ceased to rise at the fly, and I thought of trying them with a bait; so we sent for our swivel tackle, and put par or samlet on our hooks, as we bait for pike; cutting off one ventral fin on one side, and one pectoral fin on the other; and making the par spin in the most rapid streams, we had several runs from fish; and it was in this way that Poietes caught this large sea-trout, which gave excellent sport.

HAL.—This kind of fishing is not uncommon. I have often caught salmon in the Tay, fishing with pars; but though the fish ran at the bait, when they would not rise at the fly, while the tide was ebbing, they would have taken the par better still while it was flowing.

PHYS.—From my experience to-day, I conclude the salmon has habits different from the trout; for I think the fish which broke my hook, rose again at the artificial fly in the same place.

HAL.—I think you are mistaken. Salmon are usually shyer even than trout, and I never knew one in this season, that had been pricked even slightly, rise again at the artificial fly in the same pool. I should say, that their habits were precisely the same, but with more sagacity on the side of the salmon. It must have been another fish that rose at your fly in the same place.

After such severe discipline, I do not think a fish would rise for many hours, even at a natural bait.

POIET.—Your experience is so great, that I dare say I was mistaken; yet it seemed a fish of the same size.

HAL.—Salmon often in this season haunt the streams in pairs; but so far from rising again after being pricked, they appear to me to learn, when they have been some time in the river, that the artificial fly is not food, even without having been touched by the hook. In the river at Galway, in Ireland, I have seen above the bridge some hundreds of salmon lying in rapid streams, and from five to ten fishermen tempting them with every variety of fly, but in vain. After a fish had been thrown over a few times, and risen once or twice and refused the fly, he rarely ever took any notice of it again in that place. It was generally nearest the tide that fish were taken, and the place next the sea was the most successful stand, and the most coveted; and when the water is low and clear in this river, the Galway fishermen resort to the practice of fishing with a naked hook, endeavouring to entangle it in the bodies of the fish; a most unartistlike practice. In spring fishing, I have known a hungry, half-starved salmon, rise at the artificial fly a second time, after having been very slightly touched by it; but even this rarely happens; and when I have seen it, the water has been coloured.

PHYS.—Can you tell us why the fish rise better at the fly when the tide is flowing, than when it is ebbing? There seems no reason why flies should be sought for by the fish at one of these seasons, rather than at the other.

HAL.—The turn of the salt water brings up aquatic insects, and perhaps small fish; and I suppose salmon know this, and search for food at a time when it is likely to be found. I cannot think, that in these pools they

can be on the look-out for flies, for there are never any on the surface of the water; and I imagine they take the gaudy fly, with its blue kingfisher and golden pheasant's feathers, for a small fish.

ORN.—I have always supposed that they took it for a libella, or dragon-fly; for I have often seen these brilliant flies haunting the water.

HAL.—I never saw a dragon-fly drop on the water, or taken by a fish; and salmon sometimes rise even in the salt water, where dragon-flies are never found. There is no difficulty in explaining why salmon in inland rivers should take flies, where natural flies are abundant; but fish, when they have lain long in pools in the river, and fed on natural flies, will no longer take these bright flies, and then even a trout-fly is often most successful. I have sometimes thought that the rising of salmon and sea-trout at these bright flies, as soon as they come from the sea into rivers, might depend upon a sort of imperfect memory of their early food and habits; for flies form a great part of the food of the salmon fry, which, for a month or two after they are hatched, feed like young trouts; and in March and April, the spring flies are their principal nourishment. In going back to fresh water, they may perhaps have their habits of feeding recalled to them, and naturally search for their food at the surface.

POIET.—This appears to me very probable. But it is late, and we must return and compare the crimped trout and salmon: and I hope we shall have another good day to-morrow, for the clouds are red in the west.

PHYS.—I have no doubt of it, for the red has a tint of purple.

HAL.—Do you know why this tint portends fine weather?

PHYS.—The air, when dry, I believe, refracts more red, or heat-making rays; and as dry air is not perfectly transparent, they are again reflected in the horizon. I have generally observed a coppery or yellow sunset to foretel rain; but, as an indication of wet weather approaching, nothing is more certain than a halo round the moon, which is produced by the precipitated water; and the larger the circle, the nearer the clouds, and consequently the more ready to fall.

HAL.—I have often observed, that the old proverb is correct—

A rainbow in the morning is the shepherd's warning :

A rainbow at night is the shepherd's delight.

Can you explain this omen ?

PHYS.—A rainbow can only occur when the clouds containing or depositing the rain, are opposite to the sun; and in the evening the rainbow is in the east, and in the morning in the west; and as our heavy rains, in this climate, are usually brought by the westerly wind, a rainbow in the west indicates that the bad weather is on the road, by the wind, to us; whereas the rainbow in the east, proves that the rain in these clouds is passing from us.

POIET.—I have often observed that, when the swallows fly high, fine weather is to be expected or continued: but when they fly low, and close to the ground, rain is almost surely approaching. Can you account for this?

HAL.—Swallows follow the flies and gnats; and flies and gnats usually delight in warm strata of air; and as warm air is lighter, and usually moister, than cold air, when the warm strata of air are high, there is less chance of moisture being thrown down from them, by the mixture with cold air; but when the warm and moist air is close to the surface, it is almost certain that,

as the cold air flows down into it, a deposition of water will take place.

POIET.—I have often seen sea-gulls assemble on the land, and have almost always observed, that very stormy and rainy weather was approaching. I conclude that these animals, sensible of a current of air approaching from the ocean, retire to the land to shelter themselves from the storm.

ORN.—No such thing. The storm is their element; and the little petrel enjoys the heaviest gale, because, living on the smaller sea insects, he is sure to find his food in the spray of a heavy wave—and you may see him flitting above the edge of the highest surge. I believe that the reason of this migration of sea-gulls, and other sea birds, to the land, is their security of finding food. They may be observed, at this time, feeding greedily on the earth worms and larvæ, driven out of the ground by severe floods; and the fish, on which they prey in fine weather in the sea, leave the surface, when storms prevail, and go deeper. The search after food, as we agreed on a former occasion, is the principal cause why animals change their places. The different tribes of the wading birds always migrate, when rain is about to take place; and I remember once, in Italy, having been long waiting, in the end of March, for the arrival of the double snipe in the Campagna of Rome, —a great flight appeared on the 3d of April, and the day after, heavy rain set in, which greatly interfered with my sport. The vulture, upon the same principle, follows armies; and I have no doubt, that the augury of the ancients, was a good deal founded upon the observation of the instincts of birds. There are many superstitions of the vulgar, owing to the same source. For anglers, in spring, it is always unlucky to see single

magpies,—but *two* may be always regarded as a favourable omen ; and the reason is, that in cold and stormy weather, one magpie alone leaves the nest in search of food, the other remaining sitting upon the eggs, or the young ones ; but when two go out together, the weather is warm and mild, and thus favourable for fishing.

POIET.—The singular connexions of causes and effects, to which we have just referred, make superstition less to be wondered at, particularly amongst the vulgar ; and when two facts, naturally unconnected, have been accidentally coincident, it is not singular that this coincidence should have been observed and registered, and that omens of the most absurd kind, should be trusted in. In the west of England, half a century ago, a particular hollow noise on the sea-coast was referred to a spirit or goblin, called Bucca, and was supposed to foretel a shipwreck : the philosopher knows that sound travels much faster than currents in the air ; and the sound always foretold the approach of a very heavy storm, which seldom takes place on that wild and rocky coast, surrounded as it is by the Atlantic, without a shipwreck on some part of its extensive shores.

PHYS.—All the instances of omens you have mentioned, are founded on reason ; but how can you explain such absurdities as Friday being an unlucky day, the terror of spilling salt, or meeting an old woman ? I knew a man, of very high dignity, who was exceedingly moved by these omens, and who never went out shooting, without a bittern's claw fastened to his buttonhole by a riband—which he thought ensured him good luck.

POIET.—These, as well as the omens of death-watches, dreams, &c., are for the most part founded upon some accidental coincidences ; but spilling of salt, on an uncommon occasion, may, as I have known it, arise from

a disposition to apoplexy, shown by an incipient numbness in the hand, and may be a fatal symptom; and persons, dispirited by bad omens, sometimes prepare the way for evil fortune; for confidence in success, is a great means of ensuring it. The dream of Brutus, before the field of Philippi, probably produced a species of irresolution and despondency, which was the principal cause of his losing the battle: and I have heard that the illustrious sportsman, to whom you referred just now, was always observed to shoot ill, because he shot carelessly, after one of his dispiriting omens.

HAL.—I have in life met with a few things, which I found it impossible to explain, either by chance, coincidences, or by natural connexions; and I have known minds of a very superior class affected by them,—persons in the habit of reasoning deeply and profoundly.

PHYS.—In my opinion profound minds are the most likely to think lightly of the resources of human reason: it is the pert, superficial thinker, who is generally strongest in every kind of unbelief. The deep philosopher sees chains of causes and effects so wonderfully and strangely linked together, that he is usually the last person to decide upon the impossibility of any two series of events being independent of each other; and in science, so many natural miracles, as it were, have been brought to light,—such as the fall of stones from meteors in the atmosphere, the disarming a thunder cloud by a metallic point, the production of fire from ice, by a metal white as silver, and referring certain laws of motion of the sea to the moon,—that the physical inquirer is seldom disposed to assert, confidently, on any abstruse subjects belonging to the order of natural things, and still less so on those relating to the more mysterious relations of moral events, and intellectual natures.

SEVENTH DAY.

HALIEUS—POIETES—ORNITHER—PHYSICUS.

GRAYLING FISHING.

SCENE—LEINTWARDINE, NEAR LUDLOW.

Time—Beginning of October.

HAL.—You have reached your quarters. Here is your home—a rural, peaceable, and unassuming inn—with as worthy a host and hostess as may be found in this part of the country. The river glides at the bottom of the garden; and there is no stream in England more productive of grayling. The surrounding scenery is not devoid of interest, and the grounds in the distance are covered with stately woods, and laid out (or rather their natural beauties developed) by the hand of a master, whose liberal and enlightened mind even condescended to regard the amusements of the angler; and he could hardly have contributed in a more effectual manner to their comforts, than by placing the good people, who were once his servants, in this comfortable inn.

PHYS.—Are we to fish according to any rule, as to quantity or size of fish?

HAL.—You are at perfect liberty to fish as you like; but as it is possible you may catch grayling only of this year, and which are not longer than the hand, I conclude you will return such pigmies to the river, as a matter of propriety, though not of necessity.

POIET.—This river seems formed of two other streams, which join above our inn. What are the names of its sources?

HAL.—The small river to the left is called the Teme, or Little Teme; and though the least stream, it gives name to the river: the other, and more copious stream,

is called the Clun. The Little Teme contains principally trout; the Clun, both trout and grayling: but the fish are more abundant in the meadows, between this place and Downton, than in other parts of the river; for above, the stream is too rapid and shallow, to be favourable to their increase; and below, it is joined by other streams, and becomes too abundant in coarse fish.

POIET.—I cannot understand why the grayling should be so scarce a fish in England. It is abundant in many districts on the Continent; but in this island it is found, I believe, only in a few rivers; and does not exist, I think, either in Ireland or Scotland. Yet, being an Alpine fish, and naturally fond of cool water, it might have been expected among the Highlands.

HAL.—I formerly used to account for this, by supposing it an *imported* fish, and not indigenous; but, in some of my continental excursions, I have seen it living only under such peculiar circumstances, that I doubt the correctness of this, my early opinion.

POIET.—Which was, I conclude, that it was introduced by the monks, in the time when England was under the See of Rome. As a favourite fish of St. Ambrose, it was worth cultivating, as well as for its own sake; and I think you have done wrong to relinquish this idea—for, as far as my recollection serves me, the rivers that contain it, are near the ruins of great monasteries. The Avon, near Salisbury; the Ure, near Fountains Abbey; the Wye, near the great Abbey of Tintern; and, if I am not mistaken, in the lower part of this valley there are the remains of an extensive establishment of friars.

HAL.—But there are rivers near the ruins of some of the most magnificent establishments of this kind in Europe, and those nearest the Continent, where the grayling is not found; for instance, in the Stour, at

Canterbury. And if the grayling *be* an imported fish, it is wonderful that it should not be found in the rivers in Kent, and along the south-west coast of England, as in Dorsetshire, Devonshire, and Cornwall, where the monastic establishments were numerous: and why it should be found in some rivers in the mountainous parts of Wales, as in that near Llan-wrted, and the Dee; not near Val Crusis Abbey, but fifteen miles higher up, between Corwen and Bala.

POIET.—It may have been a fish imported from the Continent, and carried to a number of rivers, only a few of which may have suited its habits, and has remained there and multiplied.

HAL.—There may be truth in what you are now imagining; for the grayling requires a number of circumstances in a river to enable it to increase.

POIET.—What circumstances are these?

HAL.—A temperature in the water which must be moderate—neither too high nor too low. Grayling are never found in streams that run from glaciers—at least near their source; and they are killed by cold or heat. I once put some grayling from the Teme, in September, with some trout, into a confined water, rising from a spring in the yard at Downton; the grayling all died, but the trout lived. And in the hot summer of 1825, great numbers of large grayling died in the Avon, below Ringwood, without doubt killed by the heat in July.

POIET.—But I have heard of grayling being common in Lapland—at least so says Linnæus.

HAL.—I think it must be another species of the same genus; the same as Back's grayling, found by Captain Franklin and his companions in North America, and distinguished by a much larger back fin. Having travelled with the fishing-rod in my hand through most of

the Alpine valleys in the south and east of Europe, and some of those in Norway and Sweden, I have always found the char in the coldest and highest waters; the trout in the brooks rising in the highest and coldest mountains; and the grayling always lower, where the temperature was milder: and if in hot countries, only at the foot of mountains, not far from sources which had the mean temperature of the atmosphere—as in the Vipacco, near Goritzia—and in the streams which gush forth from the limestone caverns of the Noric Alps. Besides temperature, grayling require a peculiar character in the disposition of the water of rivers. They do not dwell, like trout, in rapid shallow torrents; nor, like char, or chub, in deep pools or lakes. They require a combination of stream and pool; they like a deep, still pool, for rest, and a rapid stream above, and a gradually declining shallow below, and a bottom, where marl or loam is mixed with gravel; and they are not found abundant, except in rivers that have these characters. It is impossible to have a more perfect specimen of a grayling river, than that now running before us, in this part of its course. You see a succession of deep, still pools, under shady banks of marl, with gentle rapids above, and a long shelving tail, where the fish sport and feed. Should there be no such pools in a river, grayling would remain, provided the water was clear, and would breed; but they cannot stem rapid streams; and they are gradually carried down lower and lower, and at last disappear. You know the Test, one of the finest trout streams in Hampshire, and, of course, in England; when I first knew this stream, twenty years ago, there were no grayling in it. A gentleman brought some from the Avon, and introduced them into the river at Longstock, above Stockbridge. They were for two or three

years very abundant in that part of the river; but they gradually descended, and though they multiplied greatly, there are now scarcely any above Stockbridge. There were, four years ago, many in the river just below; but this year there are very few there; and the great proportion that remains, is found below Houghton. I ought to mention that the water is particularly fitted for them, and they become larger in this river, than in their native place, the Avon—some of them weighing between 3 and 4 lbs. The trout, in all its habits of migration, runs upward, seeking the fresh and cool waters of mountain sources to spawn in: the grayling, I believe, has never the same habit of running up stream; I never saw one leaping at a fall, where trout are so often seen. Their large back fin seems intended to enable them to rise and sink rapidly in deep pools; and the slender nature of the body, towards the tail, renders them much more unfit for leaping cataracts, than trout and salmon. The temperature of the water, and its character as to still and stream, seem of more importance than clearness; for I have seen grayling taken in streams, that are almost constantly turbid,—as in the Inn and the Salza in the Tyrol. This fish appears to require food of a particular kind, feeding much upon flies, and their larvæ, and not usually preying upon small fish, as the trout. It has a very strong stomach, in texture like that of the gillaroo trout; and is exceedingly fond of those larvæ which inhabit cases, and are usually covered with sand or gravel. I once caught a grayling in the Wochain Save, that weighed about a pound and half, the stomach of which equalled in size a very large walnut, and contained some small shells, and two or three white round pebbles as large as small beans. In accordance with their general habits of feeding, grasshoppers are amongst their

usual food in the end of summer and autumn; and at all seasons maggots, upon fine tackle, and a small hook, offer a secure mode of taking them—the pool having been previously baited for the purpose of angling, by throwing in a handful or two a few minutes before.

POIET.—You just now said, that you thought the Lapland fish, considered by Linnæus as grayling, was the same as Back's grayling; but I find, in the Appendix to Captain Franklin's narration, two graylings described as belonging to the northern regions,—one the *Coregonus Signifer*—and another, which appears to differ very little from it, except being small in size. This seems to agree as nearly as possible with our grayling, with a difference of at most one spine in the back fin. May not this, in fact, be the same fish, as the grayling of the Alps, only rendered in a succession of generations fit for a colder climate?

HAL.—This is certainly possible: there is no doubt, that, in many successive generations, animals may be fitted to bear changes, which would have destroyed their progenitors. It is said by Bloch, that graylings are found in the Caspian Sea, and in the Baltic,—masses of saline water; though, as I have proved, the grayling of England will not bear even a brackish water, without dying. And notwithstanding the severity of the winter in high northern latitudes, streams under the ice may retain a temperature not much lower than some of the Alpine rivers. I have seen grayling in Carniola, in a source at the hottest season, not quite 50° ; and, as in large bodies of water, the deepest part, in frost, is generally the warmest—about 40° , the degree at which water is heaviest—I see no reason why grayling may not be habituated to such a temperature—coolness being generally favourable to their existence. But see, the

fog which had filled the valley, and hid the mountains from our sight, is clearing away, and I fear it will be a hot day. Before the sun becomes too bright, is the best time for fishing, in such a day as this. As soon as the fog is fairly off, the water-flies will begin to appear, and fish to sport.

PHYS.—I see the fog has already disappeared from the deep water in the meadow, where I suppose the warmth of the air, from the considerable mass of the water, is greater; and which is further removed from the hills sending down currents of cold air, from the mixture of which with the moist warm air above the river, this phenomenon is produced. I see some yellow flies beginning to come out; they have already felt the influence of the warm air: and look! a fish has just risen opposite that bank, and he rises again: let us prepare our tackle.

POIET.—What flies shall we employ?

HAL.—I recommend at least three; for the grayling lies deeper, and is not so shy a fish, as the trout; and, provided your link is fine, is not apt to be scared by the cast of flies on the water. The fineness of the link, and of the gut to which your flies are attached, is a most essential point; and the clearer the stream, the finer should be the tackle. I have known good fishermen foiled, by using a gut of ordinary thickness, though their fly was of the right size and colour. Very slender transparent gut of the colour of the water, is one of the most important causes of success in grayling fishing. Let me see your book: I will select a fine stretcher. Now, for the lowest fly, use a yellow-bodied fly, with red hackle for legs, and landrail's wing: for the second, a blue dun, with dun body; and for the highest, the claret-coloured body, with blue wings; and let your first dropper fly be about three feet from the stretcher, and from the other

dropper, and let the hanging-link, which attaches them, be $3\frac{1}{2}$ inches long.

PHYS.—There are several fish rising: I shall throw at that opposite—he appears large.

HAL.—It is a trout, and not a grayling.

PHYS.—How do you know?

HAL.—By his mode of rising. He is lying at the top of the water, taking the flies as they sail down by him, which a grayling scarcely ever does. *He* rises rapidly from the bottom or middle of the water on the contrary—darting upwards; and, having seized his fly, returns to his station. There! a grayling has risen. I do not mean, however, that this habit is invariable; I have sometimes seen trout feed like grayling, and grayling like trout; but neither of these fish emits bubbles of air in rising, as dace and chub do.

PHYS.—I have one! He has taken my blue dun, and must be a small one; for he plays with no vigour.

HAL.—He is about $\frac{3}{4}$ lb.—a fish of two years and a half old—very good for the table. I will land him, if possible.

PHYS.—There! He is off!

HAL.—This happens often with grayling: their mouths are tender, and unless the hook catches in the upper lip, which is rather thick, it is more than an equal chance that the fish escapes you.

PHYS.—Here, I have another, that has taken the stretcher; and as it is a larger hook, I hope he may be held. He is likewise a larger fish—but how oddly he spins! This, I suppose, must be owing to his large back fin, by which the stream carries him round. There he is: he has quite twisted my link; it would not be amiss to have swivels for this kind of fishing.

HAL.—It is a fish in good season,—dark above, fair below—and weighs, I should suppose, about $1\frac{1}{4}$ lb.

PHYS.—As this is the first grayling I have seen of my own taking, I must measure, weigh, and examine him.

HAL.—We can do this hereafter. See, our fish barrel; he can be kept alive till a more convenient time of the day.

PHYS.—I am disposed to gratify my curiosity immediately; for to acquire information, is at least as interesting to me as catching fish. I shall kill him by a blow on the head. He is not, I suppose, worth crimping afterwards?

HAL.—Certainly not, at this time; and it is not necessary with a fish of this size, which ought to be fried; but if we catch a large grayling, approaching to 2 lbs., he shall be killed, crimped, and boiled, like our Denham trout; you will then find him excellent, and not inferior, in my opinion, to the best perch; more like the most exquisitely tasted of all our fish, the red mullet.

PHYS.—Out of the water, this is a handsome fish, broader round the middle, and more hog-backed than the trout, but gracefully tapering towards the tail. The belly, I see, is silvery with yellow; and the pectoral, ventral, and anal fins, are almost gold-coloured; the back gray, with small black spots, and the back fin of a beautiful bright purple, with black and blue spots. It has likewise an agreeable odour; so that, both from its colour and smell, it does not seem undeserving the title given it by St. Ambrose, of *the flower of fishes*. It measures, I find, 14 inches in length; in girth, $7\frac{1}{2}$. It weighs 17 ounces. It has 10 spines in the pectoral fin, 23 in the dorsal, 16 in the ventral, 14 in the anal, and 18 in the caudal.

HAL.—Now for its anatomy. Its stomach is very thick, not unlike that of a char, or gillaroo trout, and contains flies, gravel, and larvæ, with their cases. The liver and bowels do not differ much from those of a

trout; and the ovaria or roe, with eggs as large as mustard seed, are on each side the air bladder. Though a thicker fish, the grayling does not weigh much more than the trout, in proportion to his length: the greater breadth of back is compensated by the more rapid tapering of tail; and a trout, in very high season, will sometimes equal in weight a grayling of the same length. The ova in this fish, and in the species generally, are very small at this time of the year; but, in the beginning of April, the season of their spawning, they become nearly as large as the ova of the trout—of the size of peppercorns. But I see, Poietes, your rod is in order, and there are many fish rising in this deep pool, some of which are large grayling. The blue dun is on in quantity, and we have both cloud and wind, which half an hour ago we had no right to expect. Let me advise you to use three flies of different shades of the dun: the stretcher, a pale blue with yellow body; the first dropper a winged fly with dun body; and the third, a similar fly with dark body. There, you see; he rose and refused your stretcher—and again he has a second time refused it. I think the colour of the dubbing is too bright: try a winged fly for the stretcher, with a greenish body. Good—he has taken it, and ought to be a large fish. Now we have him: he is at least sixteen inches long, and in good season. Ornither, I advise you to use the same kind of fly, and to put up your tackle precisely in the same way as Poietes has done.

POIET.—How well they rise! At that moment I had two on my line: one of them is gone, but I hope I shall land the other.

HAL.—Fish with activity while the cloud lasts. I fear the sun is coming out, when it will be more difficult to take fish. I shall try the next pool, and I advise you to follow me and fish by turns,—passing each

other, and taking different pools below, and so wend your way downwards, fishing wherever you see fish sporting. There is no better part of the river than that pool below you, and you cannot take a wrong direction. Immediately beyond Burrington Bridge you will find two excellent pools, and I advise you to go no farther down to-day. If you take a fish approaching 2 lbs., keep him alive in the fish barrel for crimping; the smaller fish you can kill, and carry with some rushes in your basket; we shall at least be able to send a dish of grayling to the patron of our sport at Downton.*

NOON.

HAL.—Well, gentlemen, I hope you have been successful.

POIET.—We have had good sport; but I have been for some time reposing on this bank, and admiring the scene below. How fine are these woods! How beautiful are these banks! the hills in the distance approach to the character of mountains; and the precipitous cliff, which forms the summit of that distant elevation, looks like a diluvian monument, and as if it had been bared and torn by a deluge which it had stemmed.

HAL.—It is one of the Clee hills, and its termination is basaltic, and such rocks usually assume such forms. But though this spot is beautiful, to-morrow I hope to show you a more exquisite landscape,—cliffs and woods, and gushing waters, of a character still more romantic. We will return to our inn by a shorter road; but tell me, have you caught a large fish amongst you, and preserved him for crimping?

* [The late Mr. Knight, whose name as a physiologist belongs to the records of science. Vide p. 151, for the author's sentiments of respect and regard for this excellent and distinguished man; and also the introductory notice in page 171, Vol. vii., to the Lectures on Agricultural Chemistry, which were dedicated to him.]

POIET.—We have preserved two fishes in the barrel, but I fear they are much below your proposed size.

HAL.—They are good fish, and of the average size of the large grayling in this stream—16 inches long, and about $1\frac{1}{2}$ lb.; they will make a good variety boiled and placed in the middle of the fried fish. And how many have you caught altogether?

POIET.—I have basketed (to coin a word) three trout and six grayling.

PHYS.—And I have taken seven grayling. I caught trout likewise, but, not considering them in proper season, I returned them to the river: but Ornither has been the most successful—he has killed ten grayling.

HAL.—The trout is rarely good in this river—at least I never saw one that cut red, and yet I have taken them in July, when their external appearance was perfect and beautiful; but they have, to my taste, always a flabby and soft character of flesh, and at all seasons here are inferior for the table to grayling; yet they often attain a considerable size. There are few small fish in these streams, and I suppose the grayling, which are most numerous, deprive the trout of their proper share of the food, depending upon larvæ and flies.

PHYS.—As we are walking through these meadows, pray give us some information as to the habits of the grayling, and its localities in England: I have been so much pleased with my sport, that I shall become, with St. Ambrose, a patron of the fish.

HAL.—The habits of the grayling, like those of most other fish, are very simple. He is, I believe, to a certain extent, gregarious—more so than the trout, and less so than the perch, and the usual varieties of the carp species known in England. His form and appearance you have seen. He is as yet scarcely in his highest

or most perfect season, which is in the end of November or beginning of December, when his back is very dark, almost black, and his belly and lower fins are nearly gold-coloured; but his brightness, like that of most other fishes, depends a good deal upon the nature of the water: and on the Continent I have seen fishes far more brilliantly coloured than in England—the lower part almost a bright orange, and the back fin approaching to the colour of the damask rose, or rather of an anemoné. The grayling spawns in April, and sometimes as late as the beginning of May: the female deposits her ova in the tails of sharp streams. I do not know how long a time is required for the exclusion of the young ones; but in the end of July, or beginning of August, they are of the size of sprats, four or five inches long, and already sport merrily at a fly. Though I have often taken grayling in bad season, yet I have rarely observed upon them the same kind of leech,* or louse, which is so often found upon the trout; from which I infer, that they seldom hide themselves, or become torpid in the mud. The grayling hatched in May or June, I conclude, become the same year, in September or October, nine or ten inches long, and weigh from *five ounces* to *half a pound*; and the year after they are from twelve to fifteen inches long, and weigh from three quarters to a

* I may mention one remarkable instance as an exception, which has recently occurred to me, the 21st of May, 1828. I was fishing in the Save, between Wochain and Veldes, in some deep, clear, bright, green pools. I caught five or six grayling between 15 and 17 inches long, that had all leeches near the tail; they were beautifully coloured, and had probably got these parasitic animals after their spawning, when they reposed. Of course this was the time when they were in their worst season. At this time they often rose at and refused the fly, but there were as yet no large flies on the water. The leech was a small greenish dark worm, about an inch or an inch and a half long, like a common leech in form and colour.

pound; and these two sizes, as you have seen, are the fish that most usually rise at the fly. The first size in this river is called *shote*, which is a Celtic word, I believe, applied likewise in the west of England to small trout. Of their growth after the second year I cannot speak; this must depend much on their food and place of residence. Marsigli says, they do not grow after the third year, and at this age, in Austria, they are sometimes a cubit long; but though I have fished much in that country, I never saw any so long. If they are taken into new and comparatively still water recently made, and where food is plenty, they grow very fast: under these circumstances, I have seen them above 3 lbs. In the Test, where, as I mentioned before, the grayling has been only recently introduced, they have sometimes been caught between 3 and 4 lbs.—in this river I never took one above 2 lbs. but I have heard of one being taken of $2\frac{1}{2}$ lbs. The grayling is a rare fish in England, and has never been found in Scotland and Ireland (as Poietes observed before); and there are few rivers containing all the conditions necessary for their increase. I know of no grayling farther west than the Avon, in Hampshire: they are found in some of the tributary streams of this river which rise in Wiltshire. I know of no river containing them on the north coast west of the Severn: there are very few only in the upper part of this river, and in the streams which form it in North Wales. There are a few in the Wye and its tributary streams. In the Lug, which flows through the next valley in Herefordshire, many grayling are found. In the Dee, as I have said before, they are found, but are not common. In Derbyshire and Staffordshire, the Dove, the Wye, the Trent and the Blithe, afford grayling; in Yorkshire, on the north coast, some of the tributary

streams of the Ribble,—and in the south, the Ure, the Wharfe, the Humber, the Derwent, and the streams that form it, particularly the Rye. There may be some other localities of this fish unknown to me; but as I have fished much, and inquired much respecting the places where it is found, I think my information tolerably correct and complete.

PHYS.—Is this fish to be fished for in spring?

HAL.—He is to be fished for at all times, for he is rarely so much out of season as to be a bad fish; and when there are flies on the water, he will generally take them: but as the trout may be considered a spring and summer fish, so the grayling may be considered as a winter and autumnal fish.

PHYS.—Of course the grayling is taken in spring with the same imitation of flies as the trout?

HAL.—The same. As far as flies are concerned, these two species feed alike; though I may say, generally, that the grayling prefers smaller flies; and the varieties of the ephemeræ or phryganeæ, of the smallest size, form their favourite food. Yet grayling do not refuse large flies; and in the Avon and Test, May-flies, and even moths, are greedily taken in the summer by large grayling. Flies, likewise, that do not inhabit the water, but are blown from the land, are good baits for grayling. There is no method more killing, for large grayling, than applying a grasshopper to the point of a leaded hook, the lead and shank of which are covered with green and yellow silk, to imitate the body of the animal. This mode of fishing is called sinking and drawing. I have seen it practised in this river with as much success as maggot fishing; and the fish taken were all of the largest size; the method being most successful in deep holes, where the bottom was not

visible, which are the natural haunts of such fish. In the winter, grayling rise for an hour or two, in bright and tolerably warm weather; and, at this time, the smallest imitations of black or pale gnats that can be made, on the smallest sized hook, succeed best in taking them. In March, the dark-bodied willow fly may be regarded as the earliest fly; the imitation of which is made by a dark claret dubbing and a dun hackle, or small starling's wing feathers. The blue dun comes on in the middle of the day in this month, and is imitated by dun hackles for wings and legs, and an olive dubbing for body. In mild weather, in morning and evening in this month, and through April, the green tail, or grannom, comes on in great quantities, and is well imitated by a hen pheasant's wing feather, a gray or red hackle for legs, and a dark peacock's harle, or dark hare's ear fur, for the body. The same kind of fly, of a larger size, with paler wings, kills well in the evening, through May or June. The imitation of a water-insect called the spider-fly, with a lead-coloured body and woodcock's wings, is said to be a killing bait, on this and other rivers, in the end of April and beginning of May; but I never happened to see it on the water. The dark alder fly, in May and June, is taken greedily by the fish: it is imitated by a dark-shaded pheasant's wing, black hackle for legs, and a peacock's harle, ribbed with red silk, for the body. At this season, and in July, imitations of the black and red palmer worms, which I believe are taken for black or brown, or red beetles or cockchafers, kill well; and, in dark weather, there are usually very light duns on the water. In August, imitations of the house fly and blue bottle, and the red and black ant fly, are taken, and are particularly killing after floods in autumn, when great quantities of the fly are

destroyed and washed down the river. In this month, in cloudy days, pale-blue duns often appear; and they are still more common in September. Throughout the summer and autumn, in fine calm evenings, a large dun fly, with a pale yellow body, is greedily taken by grayling after sunset; and the imitation of it is very killing. In the end of October, and through November, there is no fly-fishing but in the middle of the day, when imitations of the smaller duns may be used with great success; and I have often seen the fish sport most, and fly-fishing pursued with the greatest success, in bright sunshine, from twelve till half-past two o'clock, after severe frosts in the morning; and I once caught, under these circumstances, a very fine dish of fish on the 7th of November. It was in the year 1816; the summer and autumn had been peculiarly cold and wet, and, probably in consequence of this, the flies were in smaller quantity at their usual season, and there was a greater proportion later in the year.

Grayling, if you take your station by the side of a river, will rise nearer to you than trout, for they lie deeper, and therefore are not so much scared by an object on the bank; but they are more delicate in the choice of their flies than trout, and will much oftener rise and refuse the fly. Trout, from lying nearer the surface, are generally taken before grayling, where the water is slightly coloured, or after a flood: and in rain, trout usually rise better than grayling, though it sometimes happens, when great quantities of flies come out in rain, grayling, as well as trout, are taken with more certainty than at any other time;—the artificial fly, in such cases, looks like a wet fly, and allures even the grayling, which generally is more difficult to deceive than trout in the same river.

PHYS.—As I was looking into a ditch coming down the river, which is connected with it, I saw a very large eel at the bottom, that appeared to me to be feeding on a small grayling:—are there many of this fish in the Teme, and do they breed here?

HAL.—There are many of this fish in the river; but to your question, do they breed here? I must answer in the negative. The problem of their generation is the most abstruse, and one of the most curious in natural history: and though it occupied the attention of Aristotle, and has been taken up by most distinguished naturalists since his time, it is still unsolved.

PHYS.—I thought there was no doubt on the subject. Lacepède, whose book is the only scientific one on fishes I have read with attention, asserts, in the most unqualified way, that they are viviparous.

HAL.—I remember his assertion, but I looked in vain for proofs.

PHYS.—I do not remember any *facts* brought forward on the subject; but tell us what do you think upon it.

HAL.—I will tell you all I know, which is not much. This is certain, that there are two migrations of eels,—one up and one down rivers, one *from* and the other *to* the sea; the first in spring and summer, the second in autumn or early winter. The first, of very small eels, which are sometimes not more than two or two and a half inches long; the second, of large eels, which sometimes are three or four feet long, and weigh from 10 to 15, or even 20 lbs. There is great reason to believe that all eels found in fresh water are the results of the first migration: they appear in millions in April and May, and sometimes continue to rise as late even as July and the beginning of August. I remember this

was the case in Ireland, in 1823. It had been a cold backward summer, and when I was at Ballyshannon, about the end of July, the mouth of the river, which had been in flood all this month, under the fall, was blackened by millions of little eels, about as long as the finger, which were constantly urging their way up the moist rocks by the side of the fall. Thousands died, but their bodies remaining moist, served as the ladder for others to make their way; and I saw some ascending even perpendicular stones, making their road through wet moss, or adhering to some eels, that had died in the attempt. Such is the energy of these little animals, that they continue to find their way, in immense numbers, to Loch Erne. The same thing happened at the fall of the Bann, and Loch Neagh is thus peopled by them: even the mighty Fall of Shaffhausen does not prevent them from making their way to the Lake of Constance, where I have seen very large eels.

PHYS.—You have shown, that some eels come from the sea, but I do not think the facts prove, that all eels are derived from that source.

HAL.—Pardon me—I have not concluded. There are eels in the Lake of Neufchatel, which communicates by a stream with the Rhine; but there are none in the Lemane Lake, because the Rhone makes a subterraneous fall below Geneva; and though small eels can pass by moss or mount rocks, they cannot penetrate limestone, or move against a rapid descending current of water, passing, as it were, through a pipe. Again: no eels mount the Danube from the Black sea; and there are none found in the great extent of lakes, swamps, and rivers communicating with the Danube, — though some of these lakes and morasses are wonderfully fitted for them, and though they are found abundantly in the same

countries, in lakes and rivers connected with the ocean and the Mediterranean. Yet, when brought into confined water in the Danube, they fatten and thrive there. As to the instinct, which leads young eels to seek fresh water, it is difficult to reason:—probably they prefer warmth, and, swimming at the surface in the early summer, find the lighter water warmer, and likewise containing more insects, and so pursue the courses of fresh water, as the waters from the land, at this season, become warmer than those of the sea. Mr. J. Couch (*Lin. Trans.* t. xiv. p. 70) says, that the little eels, according to his observation, are produced within reach of the tide, and climb round falls to reach fresh water from the sea. I have sometimes seen them, in spring, swimming in immense shoals in the Atlantic, in Mount's Bay, making their way to the mouths of small brooks and rivers. When the cold water from the autumnal floods begins to swell the rivers, this fish tries to return to the sea; but numbers of the smaller ones hide themselves during the winter in the mud, and many of them form, as it were, masses together. Various authors have recorded the migration of eels in a singular way, — such as Dr. Plot, who, in his *History of Staffordshire*, says, that they pass in the night, across meadows, from one pond to another: and Mr. Arderon (in *Trans. Royal Soc.*) gives a distinct account of small eels rising up the flood-gates and posts of the water-works of the city of Norwich; and they made their way to the water above, though the boards were smooth planed, and five or six feet perpendicular. He says, when they first rose out of the water upon the dry board, they rested a little — which seemed to be till their slime was thrown out, and sufficiently glutinous — and then they rose up the perpendicular ascent with the same facility as if they

had been moving on a plane surface.—(Trans. Abr. vol. ix. p. 311.) There can, I think, be no doubt, that they are assisted by their small scales, which, placed like those of serpents, must facilitate their progressive motion; these scales have been microscopically observed by Lewenhoeck. — (Phil. Trans. vol. iv.) Eels migrate from the salt water of different sizes, but I believe never when they are above a foot long—and the great mass of them are only from two and a half to four inches. They feed, grow, and fatten in fresh water. In small rivers they are seldom very large; but in large deep lakes they become as thick as a man's arm, or even leg; and all those of a considerable size attempt to return to the sea in October or November, probably when they experience the cold of the first autumnal rains. Those that are not of the largest size, as I said before, pass the winter in the deepest parts of the mud of rivers and lakes, and do not seem to eat much, and remain, I believe, almost torpid. Their increase is not certainly known in any given time, but must depend upon the quantity of their food: but it is probable they do not become of the largest size, from the smallest, in one or even two seasons; but this, as well as many other particulars, can only be ascertained by new observations and experiments. Bloch states, that they grow slowly, and mentions, that some had been kept in the same pond for fifteen years. As very large eels, after having migrated, never return to the river again, they must (for it cannot be supposed that they all die immediately in the sea) remain in salt water; and there is great probability, that they are then confounded with the conger, which is found of different colours and sizes — from the smallest to the largest — from a few ounces to one hundred pounds in weight. The colour of the conger is generally paler than that of

the eel ; but, in the Atlantic, it is said, that pale congers are found on one side of the Wolf Rock, and dark ones on the other. The conger has breathing tubes, which are said not to be found in the other eel ; but to determine this would require a more minute examination than has yet been made. Both the conger and common eel have fringes along the air bladder, which are probably the ovaria ; and Sir E. Home thinks them hermaphrodite, and that the spermativ vessels are close to the kidneys. I hope this great comparative anatomist will be able to confirm his views by new dissections, and some chemical researches upon the nature of the fringes and the supposed milt. If viviparous, and the fringes contain the ova, one mother must produce tens of thousands, the ova being remarkably small ; but it appears more probable, that they are oviparous,* and that they deposit their ova in parts of the sea near deep basins, which remain warm in winter. This might be ascertained by experiment, particularly on the coasts of the Mediterranean. I cannot find, that they haunt the Arctic ocean, which is probably of too low a temperature to suit their feelings or habits ; and the Caspian and the Black Sea are probably without them, from their not being found in the Volga or Danube ; these, being shallow seas, are perhaps too cold for them in winter. From the time (April) that small eels begin to migrate, it is probable that they are generated in winter ; and the pregnant eels ought to be looked for in November, December, and January. I opened one in December, in which the fringes were abundant, but I did not

[* This opinion is in accordance with the latest and best observations, according to which the appearance of the mature ovaries and of the milts in the breeding season is so little different, that it is not easy to distinguish between them.]

examine them under the microscope, or chemically. I trust this curious problem will not remain much longer unsolved.

EIGHTH DAY.

HALIEUS—POIETES—ORNITHER—PHYSICUS.

SCENE—DOWNTON.

POIET.—THIS is a beautiful day, and, I think, for fishing, as well as for the enjoyment of the scenery, finer than yesterday. The wind blows from the south, and is balmy; and though a few clouds are collecting, they are not sufficiently dense to exclude the warmth of the sun; and, as lovers of the angle, we ought to prefer his warmth to his light.

HAL.—I do not think, as the day advances, there will be any deficiency of light; and I shall not be sorry for this, as it will enable you to see the grounds of Downton, and the distances in the landscape, to more advantage: nor will light interfere much with our sport in this valley, where, as you see, there is no want of shade.

POIET.—This spot is really very fine. The fall of water, the picturesque mill, the abrupt cliff, and the bank, covered with noble oaks, above the river, compose a scene such as I have rarely beheld in this island.

HAL.—We will wander a little longer through the walks. There you will enter a subterraneous passage in the rock beyond the mossy grotto. Behold, the castle, or mansion-house, clothed in beautiful vegetables, of which the red creeper is most distinct, rises

above on the hill! After we have finished our walk and our fishing, I will, if you please, take you to the house, and introduce you to its worthy master, whom to know is to love, to whom all good anglers should be grateful, and who has a strong claim to a more extensive gratitude—that of his country and of society—by his scientific researches on vegetable nature, which are not merely curious, but useful, and which have already led to great improvements in our fruits and plants, and generally extended the popularity of horticulture.

PHYS.—We shall be much obliged to you for the favour—provided always, you know it will not be an intrusion.

HAL.—Trust this to me. And now, as all circumstances are favourable, begin your fishing. I recommend to you that fine pool below the bridge; there are always grayling to be caught there—and already I see some rising.

PHYS.—With what imitation of flies shall we fish?

HAL.—As yesterday; a yellow fly for your stretcher, and two duns for the droppers. There, you have a good fish. And now another—both grayling.

PHYS.—I shall try the rapid at the top of this long large pool; I see several fish rising there.

HAL.—Do so. You will catch fish there—trout, but I fear no grayling.

PHYS.—Why not?

HAL.—In that part of the stream the water is too rough for grayling, and they like to be nearer the deep water. Lower down, in the same pool, there are large grayling to be caught.

PHYS.—You are in the right; the fish I have is a large trout—at least he is not much less than 2 lbs. I have landed him; shall I keep him?

HAL.—As you please : he is as good as he ever was, or ever will be in this water.

PHYS.—There are now more yellow flies out than I have seen before this season. They have appeared suddenly, as if sprung from that large alder. Though you gave us in a former conversation some account of the flies used in fishing, yet I hope you have not forgot your promise, to favour us with some more details on this subject, which, both as connected with angling, and with a curious part of natural history is very interesting.

HAL.—I wish it was in my power to give you information from my own experience, but, I am sorry to say, this has been very limited ; and though the English are peculiarly the fly fishing nation, yet our philosophical anglers have not contributed much to this department of science, and what has been done is principally by foreigners, amongst whom Swammerdam, Reaumur, and above all, De Geer are pre-eminent. To attempt to collect and apply the knowledge accumulated by these celebrated men, would carry us far beyond the limits of a day's conversation ; and as a great proportion of the insects that fly, walk, or crawl, are the food of fishes, a dissertation, or discourse on this subject, would be almost a general view of natural history. You know that frogs, crawfish, snails, earthworms, spiders, larvæ of every kind, millipedes, beetles, squillæ, moths, water flies, and land flies, are all eaten by trout ; and I once heard the late Sir Joseph Banks say, that he found a large toad stuck in the throat of a trout ; but as the skin of this animal is furnished with an exceedingly acrid secretion, it probably had been disgorged after being swallowed by a fish exceedingly hungry. But though I have found most of the insect tribes, and many small fishes, even of the most ravenous kind, as pike, in

the stomachs of trout, it never happened to me to see a toad there. I might give you an account of the birth and life of frogs, which, with respect to their generation, resemble fish, and which, when first excluded from the egg, may be considered in the tadpole state as fish; and you would not find their singular metamorphosis without interest. Or I could detail to you the true histories which naturalists have given of the habits of snails and earthworms, and of the loves of these apparently contemptible animals. Even the renewing or change of shell in the crawfish, when it falls in its soft state an easy prey to fish, is a curious subject not only for the physiologist, but likewise for the chemist. But on these points, I must request you to refer to writers on Natural History: yet I shall perform my promise, and say a few words on winged insects, which, in their origin and metamorphosis, offer the most extraordinary known miracles perhaps of terrestrial natures. You must be acquainted with the origin of our common house flies?

PHYS.—We know, that they spring from maggots, and that both the common and blue bottle fly deposit their ova in putrid animal matter, where the eggs are hatched and produce maggots, that, after feeding upon the decomposing animal material, gradually change, gain a hard or horny coat, seem as if entombed, and wait in a kind of apparent death or slumber, till they are mature for a new birth, when they burst their coatings and appear in the character of novel beings—fitted to inhabit another element.

HAL.—The history of the birth and metamorphosis of all other winged insects is very similar, but with peculiarities dependent upon their organs, wants, and habits. You know the curious details with which we have been furnished by natural historians of bees and

ants, which live in a kind of society. The ant flies, of which, as I mentioned to you, imitations are sometimes used by fishermen, were originally maggots, and became furnished with wings—not, however, passing through the aurelia state for this last transformation.

POIET.—I beg your pardon, but, having lately read an account of these animals in the very interesting book, called “An Introduction to Entomology,” I think I can correct you in one particular; which is, that the maggot of the ant *does* assume the form of a chrysalis or pupa, before it becomes a winged animal.

HAL.—It is true, that the *immediate* transition of the maggot is into a pupa, *then* into an ant, which is furnished with a kind of case, from which the wings emerge for their perfect transformation into the fly or imago state.

POIET.—You are perfectly right; and though it would be irrelevant to our present object, I could almost wish, for the sake of amusing our friends, that you would detail to us some other parts of the marvellous history of these wonderful animals, which, if not so well authenticated, might be supposed a philosophical romance. Such as the neuter or working ants feeding each other and the offspring; the manner in which they make, defend, and repair their dwellings, provide their food, watch and attend to the female, and take care of her eggs; their extraordinary mode of acquiring and defending the aphides and cocci, which bear to them the same relation that cattle do to man, which are fed by them with so much care, and the milk of which forms so important a part of their food: the predatory excursions of a particular species to carry off pupa, which they bring up as slaves.

HAL.—To enter into any of the details of the history

of insects in society, would carry us into an interminable, though interesting subject, that would soon lose all relation to fly fishing; and I fear what I have to say, even on the winged insects connected with this amusement, will occupy too much of your time, for we have not more than an hour to devote to this object.

POIET.—Tell us what you please; we are attentive.

HAL.—The various individuals of the *gryllus*, or grasshopper tribe, spring from larvæ, that do not differ much from the perfect insect, except in possessing no wings. The eggs are deposited in our meadows, and many species of this animal are gregarious, and their immigrations in swarms are well known. The butterfly and moths, as you know, lay eggs which produce caterpillars, and these caterpillars, after feeding upon vegetable food, spin themselves, or frame houses or beds, cocoons, in which they are transformed into aurelias, and from which they burst forth as perfect winged insects. The *libellula*, or dragon-fly, the most voracious of the winged insect tribe, deposits her eggs in such a manner, that the larvæ fall into the water, and, after destroying and feeding upon almost all the aquatic insects found in this element, and changing their skins at various times, they emerge in their winged form the tyrants of the insect generations in the air. The gnats and tipulæ have a similar existence. The gnat, the female of which only is said by De Geer to bite man, or suck human blood, in Sweden, lays her egg in a kind of little boat or cocoon of her own spinning. These eggs are hatched on the surface of the water, and produce the larvæ, which undergo another change into peculiar nymphæ, that still retain the power of swimming and moving, from which the perfect insect is produced during the summer heat. The flies, which I

mentioned to you in a former conversation, under the name of the grannom, or green tail, (*see fig. 2,*) are of the class *phryganeæ*, which includes all those water flies that have long antennæ, and wings something like those of moths, but usually veined and without powder. The yellow flies, which you saw a short time since sporting on the banks of the river, are of this kind. The *phryganeæ* (*see fig. 1, 2, 3, and 4,*) have four wings, which, when closed, lie flat on their backs, the two upper ones being folded over the lower ones: the flies called by anglers the willow fly, the alder fly, (*see fig. 4,*) and the dun cut, are of this kind. The *phryganeæ* lay their eggs on the leaves of willows, or other trees, that overhang the water; they are fastened by a sort of gluten to the surface of the leaf; when hatched, they produce small hexapode larvæ, which fall into the water, and by a curious economy of nature, collect round themselves, some, parts of plants or small sticks; some, gravel; and some, even shell fish. They spin themselves a sort of case of silk from their bodies, and by a gluten, that exudes from this case, cement their materials together. They feed upon aquatic plants, and sometimes upon insects, protruding only their head and legs from the case. When about to undergo transmutation, they quit their cases, rise to the surface, and wait for this process of nature in the air; but some species fix themselves on plants or stones: they burst the skin of the larvæ, and appear perfect animals, male and female, of full size, and powers. In the early spring, the species which are called green tails, from the colour of the bags of eggs in the female, appear in the warm gleams of sunshine, that happen in cloudy days, and they then cover the face of the water, and are greedily seized on by the fish. As the season advances, they appear principally in the

PHRYGANEÆ, WITH THEIR IMITATIONS.



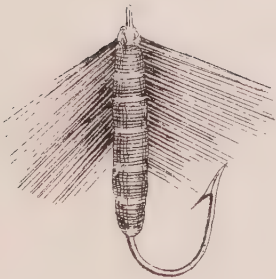
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EPHEMERE WITH THEIR IMITATIONS.



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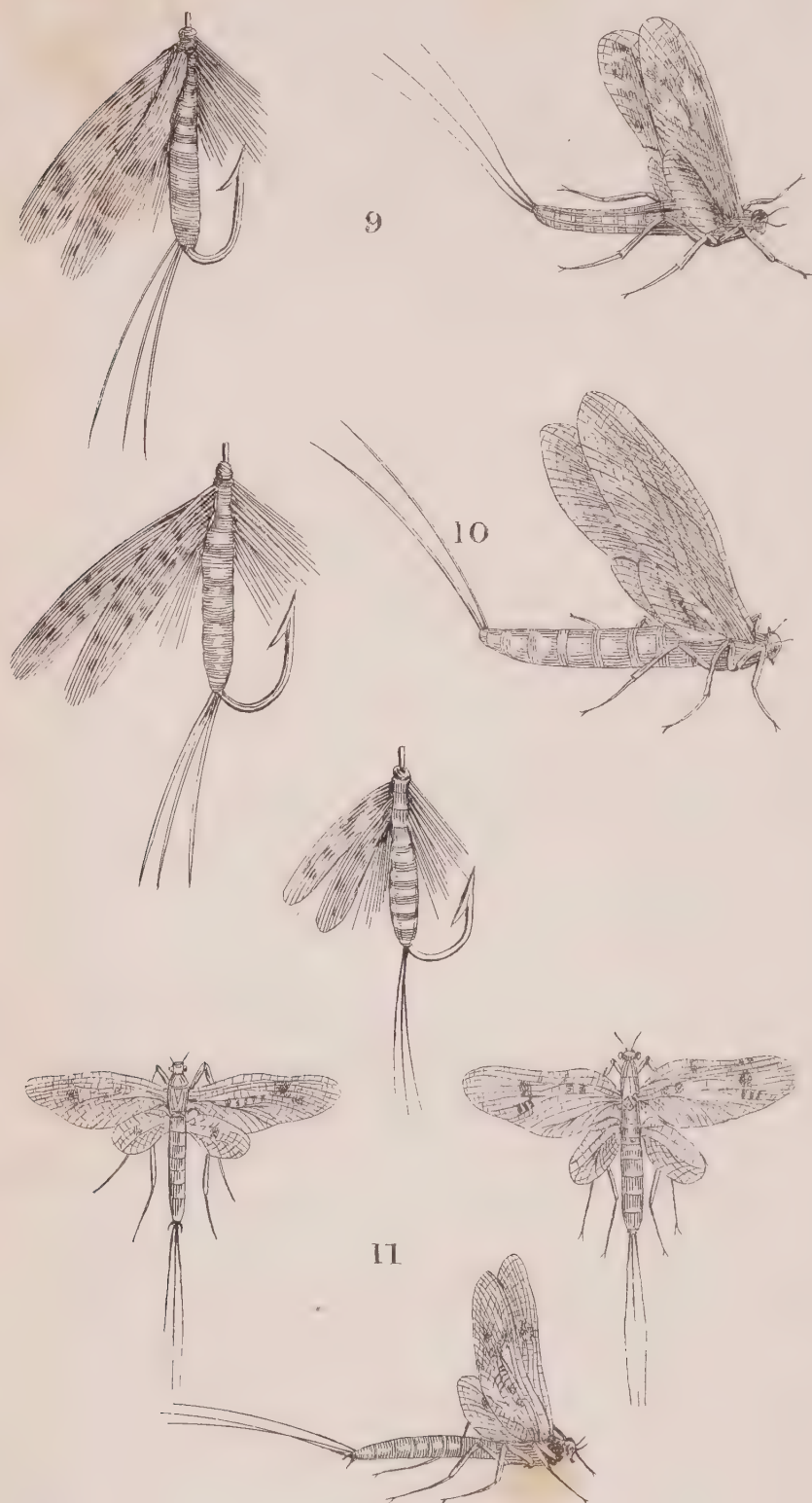
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EPHEMERÆ, WITH THEIR IMITATIONS.



morning and evening. In the heat of summer, the phryganeæ are almost nocturnal flies, and seem to have the habits of moths: at this season, *now*, I should say, the few flies that appear are generally seen in the day-time. The *ephemeræ*, another class of flies peculiarly interesting to the fisherman, differ from the phryganeæ in carrying their wings perpendicularly on their backs, and in having long filaments or hairs in their tails. The March brown, (*see fig. 8,*) the various shades of duns, (*see fig. 5, 6, and 7,*) which I described to you on a former occasion; the green (*see fig. 9 and 10,*) and white May fly, the red spinner, (*see fig. 11,*) are all of the class *ephemeræ*. These flies are produced from larvæ which inhabit the water, which can both crawl and swim, and which generally live in holes they make in the bottom. They change their coats several times before they become nymphæ. They quit their skin on the surface of the water, but even after they are flies, they have another transformation to undergo before they are perfect. They make use of their wings only to fly to some dry bank, or trunk of a tree, where they gradually disencumber themselves of the whole of the outward habili-ment they brought from the water, including their wings. They become lighter, more beautiful in colour, and then begin their sports in the sunshine—appearing like what might be imagined of spirits freed from the weight of their terrestrial covering. This last transmutation has been observed and fully described by some celebrated naturalists, in the case of the May flies, and one or two other species, and it probably will be found a general circumstance attached to the class! I have often observed what appeared to me to be the cast-off skins of the small species of *ephemeræ* on the banks of rivers and floating in the water. The green ephemera,

or May fly, lays her eggs sitting on the water, which instantly sink to the bottom: and most of the duns, or small slender-winged flies, do the same. The gray or glossy-winged May-fly, commonly called the gray drake, performs regular motions in the air above the water, rising and falling, and sitting, as it were, for a moment on the surface, and rising again, at which time she is said to deposit her eggs. To attempt to describe all the variety of ephemeræ, that sport on the surface of the water at different times of the day, throughout the year, would be quite an endless labour. Some of them appear to live only a few hours, and none of them, I believe, have their existence protracted to more than a few days. In spring and autumn a new variety of these flies sometimes appears every day, or even in different parts of the same day. Of the beetle, or coleoptera genus, there are many varieties fed on by fishes. These insects, which are distinguished, as you know, by four wings, two husky-like shells above, and two slender and finer ones below, are bred from eggs, which they deposit in the ground, or in the dung of animals, and which, producing larvæ in the usual way, are converted into beetles, and these larvæ themselves are good bait for fish. The brown beetle, or cockchaffer, the fern fly, and the gray beetle, which are abundant in the meadows in the summer, are often blown into the water, and are the most common insects of this kind eaten by fishes. Whether the ditisci and hydrophili, the water beetles, are ever eaten by trout, I know not, but it is most probable. These singular animals are most commonly found in stagnant waters; fitted for flying, swimming, diving, and walking, they are omnivorous, and usually fly from pool to pool in the evening. They deposit their eggs in the water, where their larvæ

live, but which, to undergo transmutation into the beetle, migrate to the land. But there is hardly any insect that flies, including the wasp, the hornet, the bee, and the butterfly, that does not become at some time the prey of fishes. I have not, however, the knowledge, or if I had, have not the time, to go through the lists of these interesting little animals; but of the family of one of them I must speak—the ichneumons, that deposit their eggs in caterpillars, or the larvæ of other flies, and which feed on the unfortunate animal on which they are hatched, and come out of its interior when dead, as if it had been their parent. To enter into the philosophy of this subject, and to study the organs and faculties of these various insect tribes, in their functions of respiration, nutrition, and reproduction, would be sufficient for the labour of a life. To know what has already been done would demand the close and studious application of a comprehensive mind; and to complete this branch of science in all its parts, is probably almost above human powers: but much might be done if enlightened persons would follow the example of De Geer, Reaumur, and Huber, and study minutely the habits of particular tribes; and it is probable, that physiology might be much advanced by minutely investigating the simplest forms of living beings, and that particularly with respect to the functions of reproduction: a minute study of the modifications of which the forms of animals seem susceptible, particularly in the hymenopterous, or bee tribe, might lead to very important results.

POIET.—Even in a moral point of view, I think the analogies derived from the transformation of insects admit of some beautiful applications, that have not been neglected by pious entomologists. The three states—of the caterpillar, pupa, or aurelia, and butterfly—have,

since the time of the Greek poets, been applied to typify the human being—its terrestrial form, apparent death, and ultimate celestial destination; and it seems more extraordinary that a sordid and crawling worm should become a beautiful and active fly—that an inhabitant of the dark and fetid dunghill should, in an instant, entirely change its form, rise into the blue air, and enjoy the sunbeams,—than that a being, whose pursuits here have been after an undying name, and whose purest happiness has been derived from the acquisition of intellectual power and finite knowledge, should rise hereafter into a state of being, where immortality is no longer a name, and ascend to the source of Unbounded Power and Infinite Wisdom.

PHYS.—I have been listening, Halieus, to your account of water-flies with attention, and I only regret, that your details were not more copious; let me now call your attention to that Michaelmas daisy. A few minutes ago, before the sun sunk behind the hill, its flowers were covered with varieties of bees, and some wasps, all busy in feeding on its sweets. I never saw a more animated scene of insect enjoyment. The bees were most of them humble-bees, some new to me, and the wasps appeared different from any I have seen before.

HAL.—I believe this is one of the last autumnal flowers that insects of this kind haunt. In sunny days it is their constant point of resort, and it would afford a good opportunity to the entomologist to make a collection of British bees.

POIET.—I neither hear the hum of the bee, nor can I see any on its flowers. They are now deserted.

PHYS.—Since the sun has disappeared, the cool of the evening has, I suppose, driven the little winged plunderers to their homes; but see, there are two or

three humble bees which seem languid with the cold, and yet they have their tongues still in the fountain of honey. I believe one of them is actually dead, yet his mouth is still attached to the flower. He has fallen asleep, and probably died whilst making his last meal of ambrosia.

ORN.—What an enviable destiny, quitting life in the moment of enjoyment, following an instinct, the gratification of which has been always pleasurable! so beneficent are all the laws of Divine Wisdom.

PHYS.—Like Ornither, I consider the destiny of this insect as desirable, and I cannot help regarding the end of human life as most happy, when terminated under the impulse of some strong energetic feeling, similar in its nature to an instinct. I should not wish to die like Attila; but the death of Epaminondas or Nelson in the arms of victory, their whole attention absorbed in the love of glory and of their country, I think really enviable.

POIET.—I consider the death of the martyr or the saint as far more enviable; for in this case, what may be considered as a divine instinct of our nature, is called into exertion, and pain is subdued, or destroyed, by a secure faith in the power and mercy of the Divinity. In such cases man rises above mortality, and shows his true intellectual superiority. By intellectual superiority I mean that of his spiritual nature, for I do not consider the results of reason as capable of being compared with those of faith. Reason is often a dead weight in life, destroying feeling, and substituting, for principle, calculation and caution; and, in the hour of death, it often produces fear or despondency, and is rather a bitter draught, than nectar or ambrosia in the last meal of life.

HAL.—I agree with Poietes. The higher and more intense the feeling, under which death takes place, the happier it may be esteemed; and I think even Physicus will be of our opinion, when I recollect the conclusion of a conversation in Scotland. The immortal being never can quit life with so much pleasure as with the feeling of immortality secure, and the vision of celestial glory filling the mind, affected by no other passion than the pure and intense love of God.

NINTH DAY.

HALIEUS—POIETES—ORNITHER—PHYSICUS.

FISHING FOR HUCHO.

SCENE—THE FALL OF THE TRAUN, UPPER AUSTRIA.

Time—July.

POIET.—This is a glorious scene! And the fall of this great and clear river, with its accompaniments of wood, rock, and snow-clad mountain, would alone furnish matter for discussion and conversation for many days. This place is quite the paradise of a poetical angler; the only danger is that of satiety with regard to sport; for these great grayling and trout are so little used to the artificial fly, that they take almost any thing moving on the top of the water. You see I have put on a salmon fly, and still they rise at it, though they never can have seen any thing like it before—and it is, in fact, not like any thing in nature.

HAL.—You are right, they never have seen any thing like it before; but, in its motion, it is like a large fly,

and this is the season for large flies. The stone fly and the May fly, you see, occasionally drop upon the water, and the colour of your large fly is not unlike that of the stone fly; but if, instead of being here in the beginning of July, you had visited this spot, as I once did, in the beginning of June, you would have found more difficulty in catching grayling here, though not so much as in our English rivers—in the Test, the Derwent, or the Dove.

POIET.—How could this be?

HAL.—At this season the large flies had not yet appeared; the small blue dun was on the water, and I was obliged to use a fly the same as that which suits our spring and late autumnal fishing. The fish refused all large flies, but took greedily small ones; and, as usually happens when small flies are used, more fish escaped after being hooked than were taken; and these I found, the next day, were become as sagacious as our Dove or Test fish, and refused the artificial fly, though they greedily took the natural fly.

PHYS.—These fish, then, have the same habits as our English salmons and trouts?

HAL.—The principle to which I have referred in two former conversations must be general, though it has seemed to me, that they lost this memory sooner than the fish of our English rivers, where fly-fishing is common. This, however, may be fancy, yet I have referred it to a kind of hereditary disposition, which has been formed and transmitted from their progenitors.

PHYS.—However strange it may appear, I can believe this. When the early voyagers discovered new islands, the birds upon them were quite tame, and easily killed by sticks and stones, being fearless of man; but they soon learned to know their enemy, and this newly acquired sagacity was possessed by their offspring, who

had never seen a man. Wild and domesticated ducks are, in fact, from the same original type: it is only necessary to compare them, when hatched together under a hen, to be convinced of the principle of the hereditary transmission of habits,—the wild young ones instantly fly from man, the tame ones are indifferent to his presence.

POIET.—No one can be less disposed than I am to limit the powers of living nature, or to doubt the capabilities of organized structures; but it does appear to me quite a dream, to suppose that a fish, pricked by the hook of the artificial fly, should transmit a dread of it to its offspring, though he does not even long retain the memory of it himself.

HAL.—There are instances quite as extraordinary — but I will not dwell upon them, as I am not quite sure of the fact which we are discussing; I have made a guess only, and we must observe more minutely to establish it; it may be even as you suppose — a mere dream.

POIET.—I shall go and look at the fall: I am really satiated with sport; this is the twentieth fish I have taken in an hour, and it is a grayling of at least seventeen inches long; and there is a trout of eighteen, and several salmon trout, which look as if they had run from the sea.

HAL.—These salmon trout have run from a sea, but not from a salt sea; they are fish of the Traun See, as it is called by the Germans, or Traun Lake, which is emptied by this river.

PHYS.—Tell us why they are so different from the river trout, or why there should be two species or varieties in the same water.

HAL.—Your question is a difficult one, and it has

already been referred to in a former conversation ; but I shall repeat what I stated before, — that qualities occasioned by food, peculiarities of water, &c., are transmitted to the offspring, and produce varieties which retain their characters as long as they are exposed to the same circumstances, and only slowly lose them. Plenty of good food gives a silvery colour and round form to fish, and the offspring retain these characters. Feeding much on larvæ and on shell-fish thickens the stomach, and gives a brighter yellow to the belly and fins, which become hereditary characters. Even these smallest salmon trout have green backs, *only* black spots, and silvery bellies ; from which it is evident, that they are the offspring of lake trout, or *lachs forelle*, as it is called by the Germans ; whilst the river trout, even when 4 or 5 lbs., as we see in one of these fish, though in excellent season, have red spots. — But why that exclamation?

POIET.—What an immense fish ! There he is !

HAL.—I see nothing.

POIET.—At the edge of the pool, below the fall, I saw a fish, at least two or three feet long, rising with great violence in the water, as if in the pursuit of small fish ; and at the same time I saw two or three minnows or bleaks jump out of the water. What fish is it ? — a trout ? It appeared to me too long and too slender for a trout, and had more the character of a pike ; — yet it followed, and did not, like a pike, make a single dart.

HAL.—I see him ; it is neither a pike nor a trout, but a fish which I have been some time hoping and expecting to see here, below the fall — a *salmo hucho*, or *huchen*. I am delighted, that you have an opportunity of seeing this curious fish, and of observing his habits. I hope we shall catch him.

POIET. Catch him! we have no tackle strong enough.

HAL.—I am surprised to hear a salmon fisher talk so; yet he *is* too large to take a fly, and must be trolled for. We must spin a bleak for him, or small fish, as we do for the trout of the Thames or the salmon of the Tay. Ornither, you understand the arrangement of this kind of tackle—look out in my book the strongest set of spinning hooks you can find, and supply them with a bleak; and whilst I am changing the reel, I will give you all the information (which, I am sorry to say, is not much) that I have been able to collect respecting this fish from my own observation or the experience of others. The hucho is the most predatory fish of the salmo genus, and is made like an ill-fed trout, but longer and thicker. He has larger teeth, more spines in the pectoral fin, a thicker skin, a silvery belly, and dark spots only on the back and sides—I have never seen any on the fins. The ratio of his length to his girth is as 8 to 18, or, in well fed fish, as 9 to 20; and a fish, 18 inches long by 8 in girth, weighed 16,215 grains. Another, 2 feet long, 11 inches in girth, and 3 inches thick, weighed 4 lbs. $2\frac{1}{4}$ oz. Another, 26 inches long, weighed 5 lbs. 5 oz. Of the spines in the fins, the anal has 9, the caudal 20, the ventral 9, the dorsal 12, the pectoral 17: having numbered the spines in many, I give this as correct. The fleshy fin belonging to the genus is, I think, larger in this species than in any I have seen. Bloch, in his work on fishes, states that there are black spots on all the fins, with the exception of the anal, as a character of this fish: and Professor Wagner informs me he has seen huchos with this peculiarity; but, as I said before, I never saw any fish with spotted fins—yet I have examined those of the Danube,

Save, Drave, Mur, and Izar : perhaps this is peculiar to some stream in Bavaria — yet the huchos in the collection at Munich have it not. The hucho is found in most rivers tributary to the Danube — in the Save and Laybach rivers always ; yet the general opinion is, that they run from the Danube twice a-year, in spring and autumn. I can answer for their migration in spring, having caught several in April, in streams connected with the Save and Laybach rivers, which had evidently come from still dead water into the clear running streams, for they had the winter leech, or louse of the trout upon them : and I have seen them of all sizes, in April, in the market at Labach, from six inches to two feet long ; but they are found much larger, and reach 30, or even 40, pounds. It is the opinion of some naturalists, that it is *only* a fresh-water fish ; yet this I doubt, because it is never found beyond certain falls — as in the Traun, the Drave, and the Save ; and, there can be no doubt, comes into these rivers from the Danube ; and probably, in its largest state, is a fish of the Black Sea. Yet it can winter in fresh water ; and does not seem, like the salmon, obliged to haunt the sea, but falls back into the warmer waters of the great rivers, from which it migrates in spring, to seek a cooler temperature and to breed. The fishermen at Grätz say they spawn in the Mur, between March and May. In those I have caught at Laybach, which, however, were small ones, the ova were not sufficiently developed to admit of their spawning that spring. Marsigli says, that they spawn in the Danube in June. You have seen how violently they pursue their prey : I have never taken one without fish in his stomach ; yet, when small, they will take a fly. In the Kleingraben, which is a feeder to the Laybach river, and where they are found

of all sizes — from 20 lbs. downwards — the little ones take a fly, but the large ones are too ravenous to care about so insignificant a morsel, and prey like the largest trout, often hunting in company, and chasing the small fish into the narrow and shallow streams, and then devouring them. — But I see your tackle is ready. As a more experienced angler in this kind of fishing, you will allow me to try my fortune with this fish. I still see him feeding; but I must keep out of sight, for he has all the timidity peculiar to the salmo genus, and, if he catch sight of me, will certainly not run at the bait.

ORN.—You spin the bleak for him, I see, as for a great trout. O! there! he has run at it—and you have missed him. What a fish! You surely were too quick, for he sprang out of the water at the bleak.

HAL.—I was not too quick; but he rose just as the bleak was on the surface, and saw me; and now he is frightened, and gone down into the deep water. We must retire till we see him feeding again, which will be, I hope, in a few minutes, for his violence shows that he is not yet satisfied.

POIET.—I think I saw him moving in another part of the pool: it is now ten minutes since we saw him last.

HAL.—You are right; he is again on the feed, and in a place where we have a better chance of hooking him, as the water is deeper and in the shade. He has run again at the bleak, but only as it shone on the surface—but he is not frightened. Ah! he has taken it, and is floundering and struggling! He is a powerful fish.

ORN.—He fights well, and runs towards the side where the rock is.

HAL.—Take the net and frighten him from that

place, which is the only one where there is danger of losing him. He is clear now, and begins to tire, and in a few minutes more he will be exhausted.—Now land him,

POIET.—A noble fish ! But how like a trout — exactly like a sea-trout in whiteness, and I think in spots.

HAL.—He is much narrower; or less broad, as you would immediately discover, if you had a sea-trout here. But now we must try another pool, or the tail of this; that fish was not alone, and at the moment he took the bait, I think I saw the water move from the stir of another. Take your rod and fit your own tackle, Ornither; half the glory of catching this fish is yours, as you prepared the hooks. I see you are in earnest; the blood mounts in your face. Oh ! oh ! Ornither ! you have pulled with too much violence, and broken your tackle. Alas ! alas ! the fish you hooked was the consort of mine : he will not take again.

ORN.—The gut was bad, for I do not think I struck too violently. What a loss ! How hard, to let the first fish of the kind I ever angled for escape me !

HAL.—There are probably more : try again.

ORN.—Behold ! the loss was more owing to the imperfection of the tackle than to my ardour ; for the two end hooks only are gone, and you may see the gut worn.

HAL.—The thing is done, and is not worth comment. If you can, let the next fish that rises hook himself. When we are ardent, we are bad judges of the effort we make ; and an angler, who could be cool with a new species of salmo, I should not envy. Now all is right again : try that pool. There is a fish—ay ! and another, that runs at your bait ; but they are small ones, not much more than twice as large as the bleak ; yet they

show their spirit, and though they cannot swallow it, they have torn it. Put on another bleak. There! you have another run.

ORN.—Ay, it is a small fish, not much more than a foot long; yet he fights well.

HAL.—You have him, and I will land him. I do not think such a fish a bad initiation into this kind of sport. He does not agitate so much as a larger one, and yet gratifies curiosity. There we have him. A very beautiful fish; yet he has the leech or louse, though his belly is quite white.

ORN.—This fish is so like a trout, that, had I caught him when alone, I should hardly have remarked his peculiarities; and I am not convinced, that it is not a variety of the common trout, altered, in many generations, by the predatory habits of his ancestors.

HAL.—How far the principle of change of character and transmission of such character to the offspring will apply, I shall not attempt to determine, and whether all the varieties of the salmo with teeth in their mouth may not have been produced from one original; yet this fish is *now* as distinct from the trout, as the *char* or the *umbla* is; and in Europe, it exists only below great falls in streams connected with the Danube, and is never found in rivers of the same districts connected with the Rhine, Elbe, or which empty themselves into the Mediterranean; though trout are common in all these streams, and salmon and sea-trout in those connected with the ocean. According to the descriptions of Pallas, it occurs in the rivers of Siberia, and probably exists in those that run into the Caspian; and it is remarkable, that it is not found where the eel is usual—at least this applies to all the tributary streams of the Danube, and, it is said, to the rivers of Siberia. Wherever I have

seen it, there have been always coarse fish — as chub, white fish, bleak, &c., and rivers containing such fish are its natural haunts, for it requires abundance of food, and serves to convert these indifferent poor fish into a better kind of nourishment for man. We will now examine the interior of these fish. You see the stomach is larger than that of a trout, and the stomachs of both are full of small fish. In the larger one there is a chub, a grayling, a bleak, and two or three small carp. The skin you see is thick; the scales are smaller than those of a trout; it has no teeth on the palate, and the pectoral fin has four spines more, which, I think, enables it to turn with more rapidity. You will find at dinner, that fried or roasted, he is a good fish. His flesh is white, but not devoid of curd; and though rather softer than that of a trout, I have never observed in it that *muddiness*, or peculiar flavour, which sometimes occurs in trout, even when in perfect season.

I shall say a few words more on the habits of this fish. The hucho, as you have seen, preys with great violence, and pursues his object as a foxhound or a greyhound does. I have seen them in repose: they lie like pikes, perfectly still, and I have watched one for many minutes, that never moved at all. In this respect their habits resemble those of most carnivorous and predatory animals. It is probably in consequence of these habits, that they are so much infested by lice, or leeches, which I have seen so numerous in spring as almost to fill their gills, and interfere with their respiration, in which case they seek the most rapid and turbulent streams to free themselves from these enemies. They are very shy, and after being hooked avoid the baited line. I once saw a hucho, for which I was fishing, follow the small fish, and then the lead of the tackle; it seemed as if *this*

had fixed his attention, and he never offered at the bait afterwards. I think a hucho, that has been pricked by the hook, becomes particularly cautious, and possesses, in this respect, the same character as the salmon. In summer, when they are found in the roughest and most violent currents, their fins (particularly the caudal fin) often appear worn and broken; at this season they are usually in constant motion against the stream, and are stopped by no cataract or dam, unless it be many feet in height, and quite inaccessible. In the middle of September I have caught huchos perfectly clean in rapid cool streams, tributary to the Laybach and the Sava rivers; and, from the small development of their ovaria at this time, I have no doubt that they spawn in spring. On the 13th of September, 1828, I caught, by spinning the dead small fish, three huchos, that had not a single leech upon their bodies, and they were the first fish of the kind I ever saw free from these parasites.

ORN.—I am so much pleased with my good fortune in catching this fish, that I shall try all day to-morrow with the bait, for more of the same kind.

HAL.—You may do so; but many of these fish cannot be caught; they migrate generally when the water is foul, and, except in the spring and autumn, do not so readily run at the bait. I was once nearly a month seeking for one in rivers in which they are found, between the end of June and that of July, without being able to succeed in even *seeing* one alive; and as far as my information goes, the two places where there is most probability of taking them, are at Laybach and Ratisbon, in the tributary streams to the Sava, and in the Danube; and the best time, in the first of these situations, is in March and April, and in the second, in May. I am told, likewise, that the Izar, which runs by

Munich, is a stream where they may be caught, when the water is clear: but I have never fished in this stream—it having been foul, either from rain, or the melting of the snows, whenever I have been at Munich; but I have seen in the fish-market at Munich very large huchos. Late in the autumn, or in early spring, this river must be an interesting one to fish in, as the *schill*, or *perca lucio perca*, and three other species of *perca* are found in it—the zingel, the apron, and the *perca schrätz*—all fish of prey, and excellent food. I have eaten them, but never taken them; they are rare in European rivers, though not, like the hucho, peculiar to the tributary streams of the Danube. The *schill* is found likewise in the Sprey and in the Hungarian lakes, and, according to Bloch, the zingel in the Rhone.

POIET.—I should like extremely to fish in the Izar: it is, I think, a new kind of pleasure to take a new kind of fish, even though it is not unknown to Natural Historians. But the most exquisite kind of angling, in my opinion, would be that of angling in a river never fished in by Europeans before; and I can scarcely imagine sport of a higher kind than that which involves a triple source of pleasure—catching a fish, procuring good food for the table, and making a discovery in Natural History, at the same time. Sir Joseph Banks, who was always a great amateur of angling, had often this kind of gratification. And to Captain Franklin and Dr. Richardson, in their expedition to the Arctic Ocean, when they were almost starving, what a delightful circumstance it must have been, to have taken with a fly those large grayling, which they mention, of a new species, equally beautiful in their appearance, and good for the table!

HAL.—When a boy, I have felt an interest in sea-

fishing, for this reason—that there was a variety of fish ; but the want of skill in the amusement—sinking a bait with a lead and pulling up a fish by main force, soon made me tired of it. Since I have been a fly-fisher, I have rarely fished in the sea, and then only with a reel and fine tackle from the rocks, which is at least as interesting an amusement as that of the Cockney fishermen, who fish for roach and dace in the Thames, which I have tried twice in my life, but shall never try again.

PHYS.—You are severe on Cockney fishermen, and, I suppose, would apply to *them only*, the observation of Dr. Johnson, which on a former occasion you would not allow to be just : “Angling is an amusement with a stick and a string ; a worm at one end, and a fool at the other.” And to yourself you would apply it with this change : “a fly at one end, and a philosopher at the other.” Yet the pleasure of the Cockney Angler appears to me of much the same kind, and perhaps more continuous than yours ; and he has the happiness of constant occupation and perpetual pursuit in as high a degree as you have ; and if we were to look at the real foundations of your pleasure, we should find them, like most of the foundations of human happiness—vanity or folly. I shall never forget the impression made upon me some years ago, when I was standing on the pier at Donegal, watching the flowing of the tide : I saw a lame boy of fourteen or fifteen years old, very slightly clad, that some persons were attempting to stop in his progress along the pier ; but he resisted them with his crutches, and, halting along, threw himself from an elevation of five or six feet, with his crutches, and a little parcel of wooden boats, that he carried under his arm, on the sand of the beach. He had to scramble or halt at least 100 yards, over hard rocks, before he reached

the water, and he several times fell down and cut his naked limbs on the bare stones. Being in the water, he seemed in an ecstasy, and immediately put his boats in sailing order, and was perfectly inattentive to the counsel and warning of the spectators, who shouted to him, that he would be drowned. His whole attention was absorbed by his boats. He had formed an idea, that one should outsail the rest, and when this boat was foremost he was in delight; but if any one of the others got beyond it he howled with grief; and once I saw him throw his crutch at one of the unfavoured boats. The tide came in rapidly—he lost his crutches, and would have been drowned, but for the care of some of the spectators: he was however wholly inattentive to any thing save his boats. He is said to be quite insane and perfectly ungovernable, and will not live in a house, or wear any clothes, and his whole life is spent in this one business—making and managing a fleet of wooden boats, of which he is sole admiral. How near this mad youth is to a genius, a hero, or to an angler, who injures his health and risks his life by going into the water as high as his middle, in the hope of catching a fish which he sees rise, though he already has a pannier full.

HAL.—Or a statesman, working by all means, fair and foul, to obtain a blue riband. Or a fox-hunter, risking his neck to see the hounds destroy an animal, which he preserves to be destroyed, and which is good for nothing. Or an aged, licentious voluptuary, using all the powers of a high and cultivated intellect to destroy the innocence of a beautiful virgin—for a transient gratification to render her miserable, and by making a flaw in an inestimable and brilliant gem, utterly to destroy its value.

PHYS.—You might go on and cite almost all the objects of pursuit of rational beings, as, by distinction, they are called. But to return to your favourite amusement. I wonder that, with such a passion for angling, you have never made an expedition in one of our whalers—with Captain Scoresby, for instance: you would then have enjoyed sport of a new kind.

HAL.—I should like much to see a whale taken, but I do not think the sight worth the dangers and privations of such a voyage. It would only be an amusing spectacle, and not an enterprise, unless, indeed, I employed myself the harpoon; and, after all, it must be a tedious operation, that of watching the sinking and rising of a fish, obedient to a natural instinct, which, in this instance, is the cause of his death.

POIET.—How?

HAL.—The whale, having no air bladder, can sink to the lowest depths of the ocean, and, mistaking the harpoon for the teeth of a sword-fish or a shark, he instantly descends, this being his manner of freeing himself from these enemies, who cannot bear the pressure of a deep ocean, and from ascending and descending in small space, he puts himself in the power of the whaler; whereas, if he knew his force, and were to swim on the surface in a straight line, he would break or destroy the machinery, by which he is arrested, as easily as a salmon breaks the single gut of a fisher, when his reel is entangled.

POIET.—My amusement in such a voyage, would be to look for the kraken and the sea-snake.

HAL.—You have a vivid imagination, and might see them.

POIET.—Then you do not believe in the existence of these wonderful animals?

HAL.—No more than I do in that of the merman or mermaid.

POIET.—Yet we have histories, which seem authentic, of the appearance of these monsters; and there are not wanting persons who assert that they have seen the mermaid even in these islands.

HAL.—I disbelieve the authenticity of these stories. I do not mean to deny the existence of large marine animals having analogies to the serpent; the conger, we know, is such an animal: I have seen one nearly ten feet long, and there may be longer ones; but such animals do not come to the surface. The only sea-snake that has been examined by naturalists, turned out to be a putrid species of shark—the *squalus maximus*. Yet all the newspapers gave accounts of this as a real animal, and endowed it with feet, which do not belong to serpents. And the sea-snakes, seen by American and Norwegian captains, have, I think, generally been a company of porpoises, the rising and sinking of which, in lines, would give somewhat the appearance of the coils of a snake. The kraken, or island fish, is still more imaginary. I have myself seen immense numbers of enormous *urticæ marinæ*, or blubbers, in the north seas, and in some of the Norwegian *fiords*, or inland bays, and often these beautiful creatures give colour to the water; but it is exceedingly improbable that an animal of this genus should ever be of the size, even of the whale: its soft materials are little fitted for locomotion, and would be easily destroyed by every kind of fish. Hands and a finny tail are entirely contrary to the analogy of nature; and I disbelieve the mermaid, upon philosophical principles. The dugong and manatee are the only animals combining the functions of the mammalia, with some of the characters of fishes, that can be ima-

gined, even as a link, in this part of the order of nature. Many of these stories have been founded upon the long-haired seal, seen at a distance; others, on the appearance of the common seal, under particular circumstances of light and shade; and some on still more singular circumstances. A worthy baronet, remarkable for his benevolent views and active spirit, has propagated a story of this kind; and he seems to claim for his native country the honour of possessing this extraordinary animal; but the mermaid of Caithness, was certainly a *gentleman*, who happened to be travelling on that wild shore, and who was seen bathing by some young ladies at so great a distance, that not only *genus*, but gender, was mistaken. I am acquainted with him, and have had the story from his own mouth. He is a young man, fond of geological pursuits; and one day in the middle of August, having fatigued and heated himself by climbing a rock to examine a particular appearance of granite, he gave his clothes to his Highland guide, who was taking care of his pony, and descended to the sea. The sun was just setting, and he amused himself for some time by swimming from rock to rock, and having unclipped hair and no cap, he sometimes threw aside his locks, and wrung the water from them on the rocks. He happened the year after to be at Harrowgate, and was sitting at table with two young ladies from Caithness, who were relating to a wondering audience the story of the mermaid they had seen, which had already been published in the newspapers: they described her, as she usually is described by poets, as a beautiful animal, with remarkably fair skin, and long green hair. The young gentleman took the liberty, as most of the rest of the company did, to put a few questions to the elder of the two ladies—such as, on what day, and precisely where, this sin-

gular phenomenon had appeared. She had noted down, not merely the day, but the hour and minute, and produced a map of the place. Our bather referred to his journal, and showed that a human animal was swimming in the very spot at that very time, who had some of the characters ascribed to the mermaid, but who laid no claim to others, particularly the green hair and fish's tail; but being rather sallow in the face, was glad to have such testimony to the colour of his body beneath his garments.

POIET.—But I do not understand upon what philosophical principles you deny the existence of the mermaid. We are not necessarily acquainted with all the animals that inhabit the bottom of the sea; and I cannot help thinking there must have been some foundation for the Fable of the Tritons and Nereids.

HAL.—Ay; and of the ocean divinities, Neptune and Amphitrite!

POIET.—Now I think you are prejudiced.

HAL.—I remember the worthy baronet, whom I just now mentioned, on some one praising the late Sir Joseph Banks very highly, said, “Sir Joseph was an excellent man—but he had his prejudices.” What were they? said my friend. “Why, he did not believe in the mermaid.” Pray still consider me as the baronet did Sir Joseph—prejudiced on this subject.

ORN.—But give us some reasons for the impossibility of the existence of this animal.

HAL.—Nay, I did not say impossibility; I am too much of the school of Izaak Walton, to talk of impossibility. It doubtless might please God to make a mermaid; but I do not believe God ever did make one.

ORN.—And why?

HAL.—Because wisdom and order are found in all

his works, and the parts of animals are always in harmony with each other, and always adapted to certain ends consistent with the analogy of nature ; and a human head, human hands, and human mammæ, are wholly inconsistent with a fish's tail. The human head is adapted for an erect posture ; and in such a posture, an animal with a fish's tail could not swim ; and a creature with lungs must be on the surface several times in a day—and the sea is an inconvenient breathing place : and hands are instruments of manufacture—and the depths of the ocean are little fitted for fabricating that mirror, which our old prints gave to the mermaid. Such an animal, if created, could not long exist ; and, with scarcely any locomotive powers, would be the prey of other fishes, formed in a manner more suited to their element. I have seen a most absurd fabrication of a mermaid, exposed as a show in London, said to have been found in the Chinese seas, and bought for a large sum of money. The head and bust of two different apes were fastened to the lower part of a kipper salmon, which had the fleshy fin, and all the distinct characters of the *salmo salar*.

ORN.—And yet there were people who believed this to be a real animal.

HAL.—It was insisted on, to prove the truth of the Caithness story. But what is there which people will not believe ?

POIET.—In listening to your conversation, we have forgotten our angling, and have lost some moments of fine cloudy weather.

HAL.—I thought you were tired of catching trouts and graylings, and I therefore did not urge you to continue your fly-fishing ; and this part of the river does not contain so many grayling as the pools above—but

there are good trout, and it is possible there may be huchos. Let me recommend to you to put on minnow tackle—that tackle with the five small hooks; and, as we have minnows and bleaks, you may perhaps hook trout, or even huchos; and in half an hour our fish dinner at the inn will be ready. I shall return there to see that all is right; and shall expect you, when you have finished your fishing.

[*They all meet in the dining room of the inn.*]

HAL.—Well, what sort of sport have you had, since I left you?

POIET.—We have each caught a trout and two large chubs, and have had two or three runs besides—but we saw no huchos; and though several large grayling rose in one of the streams, and we tried to catch them, by spinning the minnow in every possible way, yet they took no notice of our bait.

HAL.—This is usually the case. I have heard of anglers who have taken grayling with minnows; but it is a rare occurrence, and never happened to me. Your dinner, I dare say, is now ready; and you know it is a dinner entirely of the *genus salmo*, with vegetables and fruit. You have hucho from the Traun, and char from Aussec, and trout from the Traun See, that were brought alive to the inn, and have only just been killed and crimped, and are now boiling in salt and water; and you have likewise grayling and laverets from the Traun See, which are equally fresh, and will be fried.

PHYS.—I think, in this part of the Continent, the art of carrying and keeping fish, is better understood than in England. Every inn has a box containing grayling, trout, carp, or char, into which water from a spring runs; and no one thinks of carrying or sending *dead* fish for a

dinner. A fish-barrel, full of cool water, which is replenished at every fresh source amongst these mountains, is carried on the shoulders of the fisherman. And the fish, when confined in wells, are fed with bullock's liver, cut into fine pieces, so that they are often in better season in the tank or stew, than when they were taken. I have seen trout, grayling, and char even, feed voraciously, and take their food almost from the hand. These methods of carrying and preserving fish, have, I believe, been adopted from the monastic establishments. At Admont, in Styria, attached to the magnificent monastery of that name, are abundant ponds and reservoirs for every species of fresh-water fish; and the char, grayling, and trout are preserved in different waters—covered, enclosed, and under lock and key.

POIET.—I admire, in this country, not only the mode of preserving, carrying, and dressing fish, but I am delighted, generally, with the habits of life of the peasants, and with their manners. It is a country in which I should like to live; the scenery is so beautiful, the people so amiable and good-natured, and their attentions to strangers so marked by courtesy and disinterestedness.

PHYS.—They appear to me very amiable and good; but all classes seem to be little instructed.

POIET.—There are few philosophers among them, certainly; but they appear very happy, and

Where ignorance is bliss, 'tis folly to be wise.

We have neither seen nor heard of any instances of crime, since we have been here. They fear their God, love their sovereign, are obedient to the laws, and seem perfectly contented. I know you would contrast them with the active and educated peasantry of the manufacturing districts of England; but I believe they are much happier, and I am sure they are generally better.

PHYS.—I doubt this: the sphere of enjoyment, as well as of benevolence, is enlarged by education.

POIET.—I am sorry to say I think the system carried too far in England. God forbid that any useful light should be extinguished! Let persons who wish for education receive it; but it appears to me, that in the great cities in England, it is as it were, forced upon the population; and that sciences, which the lower classes can only very superficially acquire, are presented to them; in consequence of which they often become idle and conceited, and above their usual laborious occupations. The unripe fruit of the tree of knowledge is, I believe, always bitter or sour; and scepticism and discontent—sicknesses of the mind—are often the results of devouring it.

HAL.—Surely you cannot have a more religious, more moral, or more improved population than that of Scotland?

POIET.—Precisely so. In Scotland, education is not forced upon the people—it is sought for, and it is connected with their forms of faith, acquired in the bosoms of their families, and generally pursued with a distinct object of prudence or interest: nor is that kind of education wanting in this country.

PHYS.—Where a book is rarely seen, a newspaper never.

POIET.—Pardon me—there is not a cottage without a prayer book; and I am not sorry, that these innocent men are not made active and tumultuous subjects of *King Press*, whom I consider as the most capricious, depraved, and unprincipled tyrant that ever existed in England. Depraved—for it is to be bought by great wealth; capricious—because it sometimes follows, and sometimes forms, the voice of the lowest mob; and un-

principled—because, when its interests are concerned, it sets at defiance private feeling and private character, and neither regards their virtue, dignity, nor purity.

HAL.—My friends, you are growing warm. I know you differ essentially on this subject; but surely you will allow that the full liberty of the press, even though it sometimes degenerates into licentiousness, and though it may sometimes be improperly used by the influence of wealth, power, or private favour, is yet highly advantageous, and even essential to the existence of a free country; and, useful as it may be to the population, it is still more useful to the government, to whom, as expressing the voice of the people, though not always *vox Dei*, it may be regarded as oracular or prophetic.—But let us change our conversation, which is neither in time nor place.

POIET.—This river must be inexhaustible for sport: I have nowhere seen so many fish.

HAL.—However full a river may be of trout and grayling, there is a certain limit to the sport of the angler, if continuous fishing be adopted in the same pools. Every fish is in its turn made acquainted by diurnal habit with the artificial fly, and either taken or rendered cautious; so that, in a river fished much by one or two good anglers, many fish cannot be caught, except under peculiar circumstances of very windy, rainy, or cloudy weather, when many flies come on; or at night, or at the time the water is slightly coloured by a flood, or when fish change their haunts in consequence of a great inundation. In the Usk, in Monmouthshire, when it was very full of fish in the best fishing time, when the spring brown and dun flies were on the water, it was not usual for some excellent anglers, who composed a party of nine, and who fished in this river for

ten continuous days, to catch more than two or three fish each person. But one day, when the water was coloured by a flood, in which case the artificial fly could not be distinguished by the fish from the natural fly, I caught twelve or fourteen of the same fish, that had been in the habit of refusing my flies for many days successively. This was in the end of March, 1809, when the flies always came on the water with great regularity; the blues in dark days, the browns in bright days, between twelve and two o'clock in the middle of the day. In rivers where the artificial fly has never been used, I believe all the fish will mistake good imitations for natural flies, and in their turn, to use an angler's phrase, "taste the steel;" but even very imperfect imitations and coarse tackle, which are only successful at night or in turbid water, are sufficient to render fish cautious. This I am convinced of, by observing the difference of the habits of fish in strictly preserved streams, and in streams where even peasants have fished with the coarsest tackle. I might quote the Traun at Ischl, where the native fishermen used three or four of the coarsest flies on the coarsest hair links made of four or five or six hairs, and the Traun at Gmünden, where they are not allowed to fish. The fish that rose took with much more certainty at Gmünden than at Ischl.

At a time when many flies are on, particularly large ones, a few days of continuous fishing, even with a single rod, will soon make the sport indifferent in the best rivers; but the larger and the deeper the river the longer it continues, because fish change their stations occasionally, and pricked fish sometimes leave their haunts, which are occupied by others; and graylings are more disposed to change their places than trouts.

As instances of the differences in this respect between large and small rivers, I may quote the Vöckla, and the Agger in Upper Austria. The first of these rivers, when I fished in it in 1818, was full of trout and grayling, and I believe I was the first person, for at least many years, that had ever thrown an artificial fly upon it. It is a small stream, from eight to fifteen yards wide, and can every where be commanded by the double-handed rod, and is generally shallow. The first day that I fished in this stream, which was in the beginning of August, at every throw I hooked a fish, and I took out and restored again to their element in the course of a few hours more than one hundred and fifty trout and grayling. The next day I fished in the same places, but with a very different result : I caught only half a dozen large fish : the third morning, going over the same ground, I had great difficulty even to get a brace of fish for my dinner, and those, as well as I recollect, I caught by throwing in places which had not been fished before. I ought to mention, that the space of water where this experiment was made did not exceed half a mile in length. I shall now speak of the Agger, which is a much larger and deeper river than the Vöckla, and cannot be commanded in any part by a double-handed rod, being at least from forty to sixty yards across. The first time I fished this river, I had the same kind of sport as in the Vöckla ; the second day, under the same favourable circumstances, there were fewer rises than on the first day, but still sufficient to give good sport ; and it was the fourth day before it became difficult to catch a good dish of fish, and necessary to seek new water. The greater depth of the water, and the change of place of the fish, particularly the grayling, explain this, to say nothing of the greater number of fish which the larger river con-

tained. I am, of course, speaking of one of the best periods of fly-fishing, when many large flies, of which imitations are easily found, have been on the water. In spring (a bad season for fly-fishing in high Alpine countries) I have thrown great varieties of flies on these two highly stocked streams, and have found it difficult to get a brace of fish for the table, as the trout and grayling were all lying at the bottom, not expecting any *winged food* at this season.

A river that runs into a large lake affords, at its junction with the lake, by far the best place for continuous angling, particularly for trout in autumn. The fish are constantly running up the rivers for the purpose of spawning, and every day offers a succession of new shoals, of which many will take the fly; I say *many*, because at this season some of the fish, particularly the females, are capricious, and refuse a bait, of which, under other circumstances, they are greedy. I may say the same with respect to the exit of a river from a lake, to which successions of fishes resort, and though trout are found abundantly in such places, yet they are often still better places for grayling when these fish exist in the lake, the tendency of grayling being rather, as I said on another occasion, to descend than to ascend waters, whilst that of the trout is the contrary. The same principles apply to salmon and sea-trout fishing, which run up rivers from basins of the sea: the best situations for continuous angling are those parts of the river where there is a succession of fishes from the tide.

POIET.—You spoke just now of peasants fishing with the fly in Austria: I thought this art was entirely English; and though I have travelled much, I do not recollect ever to have seen fly-fishing practised by native anglers abroad.

HAL.—I assure you there are fishers with the artificial fly in different parts of Switzerland, Germany, and Illyria, though always with rude tackle, and usually upon rapid streams. Besides the Traun, I can mention the Rhine, the Rhone, and the Drave, as rivers where I have seen fish caught with rude imitations of flies used by native anglers. In Italy, where trout and grayling are very rare, and only found amongst the highest mountain chains, I have never seen any fly-fishers; but near Ravenna I have sometimes seen anglers for frogs, who threw their bait exactly as we throw a fly, and caught great numbers of these animals: and the nature of their apparatus surprised me more than their method of using it. Instead of a hook and bait they employed a small dry frog, tied to a long piece of twine, the forelegs of which projected like two hooks, and this they threw at a distance by means of a long rod. The frogs rose like fish and gorged the small dry frog, by the legs of which they were pulled out of the water. I was informed by one of these fishermen, that he sometimes took 200 frogs in this way in a morning, and that the frogs never swallowed any bait when still or apparently dead, but caught at whatever was moving or appeared alive on the surface of the water; so that this reptile feeds like a nobler animal, the eagle, only on living prey.

POIET.—You say trout are rare in Italy, yet on Ash-Wednesday, a great day for the consumption of fish in Rome, I remember to have seen some large trout, which I was told were from the Velino, above the Falls of Terni.

HAL.—I once went almost to the source of this river, above Rieti, in hopes of catching trout, but I was unsuccessful. I saw some taken by nets, but the fish were too few, and the river too foul, from the

deposition of calcareous matter, to render it a good stream for the angler. In this journey I saw some trout in brooks in the Sabine country, that I dare say might have been taken by the fly, but they were small, and like the brook trout of England. In these streams, as well as in the Velino and other torrents, I found the water-ouzel, which, as far as my knowledge extends, is always a companion of the trout, and I believe feeds much upon the same larvæ of water-flies.

ORN.—These singular little birds, as I have witnessed, walk under water, not by means of air-pump feet, as I had once conjectured, but by laying hold with their claws of stones and the projecting parts of rock; I have often watched them running beneath the surface of the sides of streams, and passing from stone to stone; and I conclude that they were then in the act of searching for or feeding upon larvæ.

HAL.—I suppose so, and I hope Ornither will shoot one to give us an opportunity of examining the contents of their stomachs, and of knowing with certainty the nature of their food.

PHYS.—The char* is a most beautiful and excellent fish, and is, of course, a fish of prey. Is he not an object of sport to the angler?

HAL.—They generally haunt deep cool lakes, and are seldom found at the surface till late in the autumn. When they are at the surface, however, they will take either fly or minnow. I have known some caught in both these ways; and have myself taken a char, even in summer, in one of those beautiful, small, deep lakes in the Upper Tyrol, near Nazereit; but it was where a cool stream entered from the mountain; and the fish did not rise, but swallowed the artificial fly under water.

* Sälmling of the Germans.

The char is always in its colour a very brilliant fish, but in different countries there are many varieties in the tint. I do not remember ever to have seen more beautiful fish than those of Aussee, which, when in perfect season, have the lower fins and the belly of the brightest vermilion, with a white line on the outside of the pectoral, ventral, anal, and lower part of the caudal fin, and with vermilion spots, surrounded by the bright olive shade of the sides and back: the dorsal fin in the char has 11 spines, the pectoral 14, the ventral 9, the anal 10, and the caudal 20. I have fished for them in many lakes, without success, both in England and Scotland, and also amongst the Alps; and I am told the only sure way of taking them is by sinking a line with a bullet, and a hook having a live minnow attached to it, in the deep water which they usually haunt; and in this way, likewise, I have no doubt the *umbla* or *ombre chevalier*, might be taken.

POIET.—I have never happened to see this fish.

HAL.—It is very like a char in form, but is without spots, and has a white and silvery belly. On the table, its flesh cuts white or cream-colour, and it is exceedingly like char in flavour. Feb. 11, 1827, one was brought me from the lake of Bourget, in Savoy; it was said to be small for this fish; it was 15 inches long, and $7\frac{1}{2}$ in circumference. In the dorsal fin there were 12 spines, in the pectoral 9, in the ventral 8, in the anal 11, and in the caudal 24.

POIET.—Is it found in this country?

HAL.—From some descriptions I have heard of certain species of the salmo found in the Maun See, Traun See, and Leopoldstadt See, I think, it is. Bloch says, that it is peculiar to the lakes of Geneva and Neufchatel; but what I have just said must convince you of the in-

accuracy of this statement, as I dare say the fish exists in other deep waters of a like character amongst the Alps. It is a fish closely allied to the char, and congenerous both in form and habits.

POIET.—Is this fish ever taken with the line?

HAL.—I believe only with nets. It feeds on vegetables; and in the stomachs of those I have opened, I have never found either flies or small fishes.

PHYS.—You mentioned, among the fish for dinner, the laveret: I never heard of this fish before.

HAL.—It is a fish known in England by the name of *shelley*, or fresh-water herring; in Wales, by that of *guinead*; in Ireland, by that of *pollan*; and in Scotland, by that of *vengis*. In colour it is most like a grayling, but with broader and larger scales: it is common in the large lakes of most Alpine countries, and is known at Geneva by the name of *ferra*; and I believe that the *salmo ceruleus*, or *wartmann* of Bloch, or the *gang-fisc* of the lake of Constance, from a comparison that I made of it with the *ferra*, is a variety of the same fish. It sometimes is as large as 2 lbs.; and when quite fresh, and well fried or broiled, is an exceedingly good fish, and calvers like a grayling.

The laveret of different lakes has appeared to me to vary in the number of the spines in the fins. One, brought me from the lake of Zurich, 13 inches long, and 8 inches in girth, had twelve spines in the dorsal fin, 15 in the pectoral fins, 11 in the ventral, 13 in the anal, and 18 in the caudal. The gang-fisc, from the lake of Constance, which was of a bluer colour, but, I think, decidedly, only a variety of the same fish, was $7\frac{3}{4}$ inches long, and 4 in girth, had 12 spines in the dorsal fin, 15 in the pectoral, 11 in the ventral, 12 in the anal, and 18 in the caudal. A laveret, from the Traun See, had 12

spines in the dorsal fin, 17 in the pectoral, 13 in the ventral fin, 12 in the anal fin, and 24 in the caudal fin. One from the Hallstadt See was a larger and broader fish, but did not differ from the laveret of the Traun See, except in having two spines less in the tail.

AT TABLE.

ORN.—Now the hucho is dressed, and on the same table with other species of the salmo, I perceive his peculiarities more distinctly; and, in addition to those you have mentioned, he appears to me to have a stronger upper jaw, and a larger projection of bone below the orbit of the eye.

HAL.—He has; and you will find a similar character in the pike and perch, and, I believe, in most fishes of prey; and the use of it seems to be, to strengthen the fulcrum of the lever on which the lower jaw moves, so as to afford the means of greater strength to the whole muscular apparatus, by means of which the fish seizes his prey.

POIET.—These fishes, then, are analogous to the predatory animals of the feline genus, which have this part of the head exceedingly strong; and it is here that the craniologists or phrenologists fix the organ of courage: does not this extensive chain of analogies offer an argument in favour of this long agitated and generally unpopular doctrine?

PHYS.—In my opinion, it offers, like most of the facts which have been brought forward to prove the truths of the view of Gall and Spurzheim, an argument rather unfavourable, when thoroughly and minutely examined.

POIET.—How?

PHYS.—In these rapacious and predatory animals,

the organization of the head must be connected with the functions of the jaws, as the construction of the shoulder-blade must be related to the use of the fore leg, which, being intended to strike and seize by talons, must have a powerful support and a strong bony apparatus in the shoulder, which might as well be called the organ of courage as the projection below the frontal bone : but these animals have no more what is called courage in man, than they have what is called reason : they face danger when they are hungry, but almost always fly when their appetite is satisfied : a hen, in defending her chickens against a powerful dog, shows quite as much of this quality as the most ferocious royal tiger. Courage is the result of strong passions or strong motives ; and in man it usually results from the love of glory or the fear of shame ; and it appears to me a perfectly absurd idea, that of connecting it with an organ, which is merely intended to assist the predatory habits and the mastication of a carnivorous animal.

HAL.—I agree with Physicus in this view of the subject. I once heard a physiologist of some reputation deducing an argument in favour of craniology from the form of the skull of the beaver, which he called a constructive animal, and contended, that there was something of the same character in the skulls of distinguished architects : now, the skull of the beaver is so formed, that he is able to use his jaws for cutting down the trees with which he makes his dam ; and if this analogy were correct, the architect ought unquestionably to employ his teeth for the same purpose ; and though I have known distinguished men, who have been in the habit of using knives for cutting furniture with a sort of nervous restlessness of hand, I do not recollect to have heard of the teeth being employed in the same way ;

and I think it would be quite as correct to find the architectural or constructive organ in the opposite part of the body, the tail, as the beaver makes a more ingenious use of this part than even of his mouth.* Pray, have you ever observed, Poietes, any particular protuberance in the nether parts of any of our distinguished architects?

POIET.—I am not a craniologist; but I would have the doctrine overturned by facts, and not by ridicule; and I have certainly seen some remarkable instances, which were favourable to the system.

HAL.—My experience is entirely on the opposite side; and I once saw a distinguished craniologist in error on a point, which he considered as the most decided. He was shown two children, one of whom was possessed of great mathematical acquirements, the other of extraordinary musical taste. With the utmost confidence he pronounced judgment, and was mistaken. It appeared to me, that whilst he was examining the two heads, he hummed an air, which, being out of tune, was not responded to by the musical child; but somehow struck the fancy of the mathematical one.

ORN.—This hucho is a very good fish; and, indeed, I can praise all the varieties of the salmo on the table, that I have yet tasted.

PHYS.—Amongst them I prefer the char, which, I think, is even better than the best fresh salmon I ever tasted.

POIET.—This char is surprisingly red and full of curd;

[* The use of the tail of the beaver referred to by the author, long believed by naturalists, has been considered imaginary by the experienced Hearne, who was well acquainted with the habits of this animal.—Vide his work entitled “A journey from Prince of Wales’s Fort in Hudson’s Bay, to the Northern Ocean,” p. 234.]

I wonder at its fat: it comes from the Gründtl See, which is a high Alpine lake, covered with ice more than half the year: what food can the fish find in so pure and cold a water?

HAL.—Minnows and small chubs are found in this lake; and the flies which haunt it in summer, have been aquatic larvæ in the autumn, winter, and spring: and there are usually great quantities of small shell-fish, which live in the deeper parts of this water; so that char may find food, even in winter; and cold, or the repose to which it leads, seems favourable to the development or conservation of fat. Most of the Polar animals (the whale, morse, seal, and white bear, for instance) are loaded with this substance; and the salmon of the Arctic Ocean are remarkable for their quantity of curd: those that run up the rivers in Russia from the White Sea, are said to be fatter and better than those caught in the streams which run into the Baltic.

ORN.—I agree with Physicus in his praise of the char: we are indebted to you, for an excellent entertainment.

HAL.—At Lintz, on the Danube, I could have given you a fish dinner of a different description, which you might have liked as a variety. The four kinds of perch, the *spiegel carpfen*, and the *siluris glanis*; all good fish, and which I am sorry we have not in England, where I doubt not they might be easily naturalized, and they would form an admirable addition to the table in inland counties. Since England has become Protestant, the cultivation of fresh-water fish has been much neglected. The *burbot*, or *lotte*, which already exists in some of the streams tributary to the Trent, and which is a most admirable fish, might be diffused without much difficulty; and nothing could be more easy than to naturalize the

spiegel, *carpfen*, and *siluris*; and I see no reason why the *perca lucio perca*, and *zingel* should not succeed in some of our clear lakes and ponds, which abound in coarse fish. The new Zoological Society, I hope, will attempt something of this kind; and it will be a better object, than introducing birds and beasts of prey—though I have no objection to any sources of rational amusement or philosophical curiosity.

POIET.—A fish dinner, such as you have just described, combined with one such as we have enjoyed to-day, might, I think, be made an interesting experimental lecture on natural history. The analogies of the different species and genera of fishes, so distinct in the form of their organs, are likewise marked in the appearance and taste of their flesh. The salmon and the char may be regarded as the generic types of the salmo. By trout, which have sometimes red, and sometimes white flesh, they are connected with the grayling and hucho. By the grayling, the trout is connected with the laveret; and by the laveret, the genus salmo is connected with the carp genus. The char is immediately connected with the grayling, and laveret, by the umbla. By the sea-trout, the salmon is connected with the trout; and by the hucho, with the pike and perch families.

HAL.—We will arrange a dinner of this kind in England, and by means of it follow the analogies of salt and fresh-water fishes. But the time for our parting is almost arrived. Let us drink a glass each of this old wine of the Danube to our next happy meeting, and go and take a last look of the Fall of the Traun, whilst our carriages are preparing.

[*They walk to the rock above the Fall of the Traun.*]

HAL.—See, the cataract is now in great beauty; the

river above is coloured by the setting sun, and the glow of the rosy light on the upper stream, is beautifully and wonderfully contrasted with the tints of the cataract below? Have you ever seen any thing so fine?

POIET.—The lights are beautiful; but I have certainly seen a finer combination of features in the Fall of the Velino, at Terni, though that water is not clear; but, even with this defect, it is certainly the most perfect of European falls. This cascade of the Traun, though not so elevated as that of Terni, and not so large as that of Schaffhausen, yet, from its perfect clearness, and the harmony of the surrounding objects, ranks high, as to picturesque effect, amongst the waterfalls of Europe; and the wonderful transparency of its pale-green water, gives it a peculiar charm in my eyes, enhanced as it is now by the light of the glowing western sky; and the tints of the quadrant iris on its spray, are not brighter than those of its stream and foam.

ORN.—We have now followed this water at least thirty miles, and wherever we have seen it, it has always displayed the same characters of clearness and rapidity—of green stream and white foam; and we have traced it from the snowy mountains of Styria to the plains of Upper Austria, where it serves to purify the darker Danube. How is it that it has preserved its transparency, though so many of its tributary streams have been foul, either from the thunder-storm, or from the sudden melting of snows?

HAL.—The three small lakes and the two larger ones, which are, in fact, its reservoirs, are the cause of this. The Gründtl See furnishes its principal stream, and this lake is fed by two others—Töplitz See and Lahngen See; and the tributary streams, which unite at Aussee, from Alten Aussee and Oden See, though one is blue

and the other yellow, yet combine to give a tint, which is nearly the same as that from the stream of the Gründtl See, and which the river retains throughout its course. Yet I have seen even this river very foul, but only in a part of its course, below Ischl. I was once at that place, when the thunder-storm of a night having washed the dust of the roads into the river, it was extremely turbid from Ischl to the Traun See. It rendered the upper part of this large lake coloured; but, notwithstanding this, the river came from the lower part of it perfectly clear, and I caught fish in it there with a fly, which, at its entrance into the lake, was quite impossible.

POIET.—You, Halieus, must certainly have considered the *causes* which produce the colours of waters. The streams of our own island are of a very different colour from these mountain rivers, and why should the same element or substance assume such a variety of tints?

HAL.—I certainly have often thought upon the subject, and I have made some observations and *one* experiment in relation to it. I will give you my opinion with pleasure; and, as far as I know, they have not been brought forward in any of the works on the properties of water, or on its consideration as a chemical element. The purest water with which we are acquainted, is undoubtedly that which falls from the atmosphere. Having touched air alone, it can contain nothing but what it gains from the atmosphere; and it is distilled without the chance of those impurities, which may exist in the vessels used in an artificial operation. We cannot well examine the water precipitated from the atmosphere, as rain, without collecting it in vessels, and all artificial contact, gives more or less of contami-

nation; but in snow, melted by the sunbeams, that has fallen on glaciers, themselves formed from frozen snow, water may be regarded as in its state of greatest purity. Congelation expels both salts and air from water, whether existing below, or formed in, the atmosphere; and in the high and uninhabited regions of glaciers, there can scarcely be any substances to contaminate. Removed from animal and vegetable life, they are even above the mineral kingdom; and though there are instances in which the rudest kind of vegetation (of the fungus or mucor kind) is even found upon snows, yet this is a rare occurrence; and red snow, which is occasioned by it, is an extraordinary and not a common phenomenon towards the pole, and on the highest mountains of the globe. Having examined the water formed from melted snows on glaciers, in different parts of the Alps, and having always found it of the same quality, I shall consider it as pure water, and describe its characters. Its colour, when it has any depth, or when a mass of it is seen through, is bright blue; and, according to its greater or less depth of substance, it has more or less of this colour: as its insipidity, and its other physical qualities, are not at this moment objects of your inquiry, I shall not dwell upon them. In general, in examining lakes and masses of water in high mountains, their colour is of the same bright azure. And Captain Parry states, that the water on the Polar ice has the like beautiful tint. When vegetables grow in lakes, the colour becomes nearer sea-green, and as the quantity of impregnation from their decay increases—greener, yellowish green, and at length, when the vegetable extract is large in quantity—as in countries where peat is found—yellow, and even brown. To mention instances, the Lake of Geneva, fed from sources

(particularly the higher Rhone) formed from melting snow, is blue; and the Rhone pours from it, dyed of the deepest azure, and retains partially this colour till it is joined by the Soane, which gives to it a greener hue. The Lake of Morat, on the contrary, which is fed from a lower country, and from less pure sources, is grass green. And there is an illustrative instance in some small lakes fed from the same source, in the road from Inspruck to Stutgard, which I observed in 1815, (as well as I recollect) between Nazareit and Reiti. The highest lake fed by melted snows in March, when I saw it, was bright blue. It discharged itself by a small stream into another, into which a number of large pines had been blown by a winter storm, or fallen from some other cause: in this lake its colour was blue-green. In a third lake, in which there were not only pines and their branches, but likewise other decaying vegetable matter, it had a tint of faded grass-green; and these changes had occurred in a space not much more than a mile in length. These observations I made in 1815: on returning to the same spot twelve years after, in August and September, I found the character of the lakes entirely changed. The pine wood washed into the second lake had disappeared; a large quantity of stones and gravel, washed down by torrents, or detached by an avalanche, supplied their place: there was no perceptible difference of tint in the two upper lakes; but the lower one, where there was still some vegetable matter, seemed to possess a greener hue. The same principle will apply to the Scotch and Irish rivers, which, when they rise or issue from pure rocky sources, are blue, or bluish green; and when fed from peat bogs, or alluvial countries, yellow, or amber-coloured, or brown — even after they have deposited a part of their

impurities in great lakes. Sometimes, though rarely, mineral impregnations give colour to water: small streams are sometimes green or yellow from ferruginous depositions. Calcareous matters seldom affect their colour, but often their transparency, when deposited, as is the case with the Velino at Terni, and the Anio at Tivoli; but I doubt if pure saline matters, which are in themselves white, ever change the tint of water.

ORN.—On what then does the tint of the ocean depend, which has itself given name to a colour?

HAL.—I think probably on vegetable matter, and, perhaps, partially, on two elementary principles, iodine and brome, which it certainly contains, though these are possibly the results of decayed marine vegetables. These give a yellow tint, when dissolved in minute portions in water, and this, mixed with the blue of pure water, would occasion sea green.* I made, many years ago, being on the *Mer de Glace*, an experiment on this subject. I threw a small quantity of iodine, a substance then recently discovered, into one of those deep blue basins of water, which are so frequent on that glacier, and, diffusing it as it dissolved with a stick, I saw the water change first to sea green in colour, then to grass green, and lastly to yellowish green: I do not, however, give this as a proof, but only as a fact favourable to my conjecture.

POIET.—It appears to me to confirm your view of the subject, that snow and ice, which are merely pure crys-

* [The ocean out of soundings is of a pure blue; the sea phrase "blue water" is synonymous with out of soundings. The sea-green water of shallow seas is commonly more or less turbid; containing yellowish matter suspended in it, or when clear, flowing over a yellowish bottom; its colour may be the consequence.]

tallized water, are always blue, when seen by transmitted light. I have often admired the deep azure in crevices in masses of snow in severe winters, and the same colour in the glaciers of Switzerland, particularly at the arch where the Arve issues, in the Valley of Chamouni. We thank you for your illustration.

HAL.—In return, I ask you for some further remarks on this grand waterfall. You said just now, you preferred the fall of the Velino for picturesque effect to any other waterfall you have seen; yet it is a small river compared even with the Traun, and nothing compared with the Gotha, the Rhine, or, above all, the Glommen.

POIET.—Size is merely comparative: I prefer the fall of the Velino, because its parts are in harmony. It displays all the force and power of the element, in its rapid and precipitous descent, and you feel, that even man would be nothing in its waves, and would be dashed to pieces by its force. The whole scene is embraced at once by the eye, and the effect is almost as sublime as that of the Glommen, where the river is at least one hundred times as large; for the Glommen falls, as it were, from a whole valley upon a mountain of granite, and unless where you see the giant pines of Norway, fifty or sixty feet in height, carried down by it and swimming in its whirlpools like straws, you have no idea of its magnitude and power: yet still, I think, considering it in all its relations, this is the most awful fall of water I have seen, as that of Velino is the most perfect and beautiful. I am not sure, that I ought not to place the fall of the Gotha above that of the Rhine, both for variety of effect and beauty; and the river, in my opinion, is quite as large, and the colour of the water quite as beautiful.

HAL.—But our horses are ready, and the time of separation arrives. I trust we shall all have a happy meeting in England in the winter. I have made you idlers at home and abroad, but I hope to some purpose; and, I trust, you will confess the time bestowed upon angling has not been thrown away. The most important principle perhaps in life is to have a pursuit—a useful one if possible, and at all events an innocent one. And the scenes you have enjoyed—the contemplations to which they have led, and the exercise in which we have indulged, have, I am sure, been very salutary to the body, and, I hope, to the mind. I have always found a peculiar effect from this kind of life; it has appeared to bring me back to early times and feelings, and to create again the hopes and happiness of youthful days.

PHYS.—I felt something like what you described, and were I convinced that, in the cultivation of the amusement, these feelings would increase, I would devote myself to it with passion; but, I fear, in my case this is impossible. Ah! could I recover any thing like that freshness of mind, which I possessed at twenty-five, and which, like the dew of the dawning morning, covered all objects and nourished all things that grew, and in which they were more beautiful even than in mid-day sunshine,—what would I not give!—All that I have gained in an active and not unprofitable life. How well I remember that delightful season, when, full of power, I sought for power in others; and power was sympathy, and sympathy power; when the dead and the unknown, the great of other ages and of distant places, were made, by the force of the imagination, my companions and friends; when every voice seemed one of praise and love; when every flower had the bloom

and odour of the rose ; and every spray or plant seemed either the poet's laurel, or the civic oak — which appeared to offer themselves as wreaths to adorn my throbbing brow. But, alas ! this cannot be ; and even you cannot have *two springs* in life—though I have no doubt you have fishing days, in which the feelings of youth return, and that your autumn has a more *vernal* character than mine.

POIET.—I do not think Halieus had ever any season, except a perpetual and gentle spring ; for the tones of his mind have been always so quiet, it has been so little scorched by sunshine, and so little shaken by winds, that, I think, it may be compared to that sem-pivernal climate fabled of the Hesperides, where the same trees produced at once buds, leaves, blossoms, and fruits.

HAL.—Nay, my friends ! spare me a little, spare my grey hairs. I have not perhaps abused my youth so much as some of my friends, but all things that you have known, I have known ; and if I have not been so much scorched by the passions from which so many of my acquaintances have suffered, I owe it rather to the constant employment of a laborious profession, and to the exertions called for by the hopes, wants, and wishes of a rising family, than to any merits of my own, either moral or constitutional. For my health, I may thank my ancestors, after my God, and I have not squandered what was so bountifully given ; and though I do not expect, like our arch-patriarch, Walton, to number ninety years and upwards, yet I hope, as long as I can enjoy in a vernal day the warmth and light of the sun-beams, still to haunt the streams—following the example of our late venerable friend, the President of the Royal

Academy,* in company with whom, when he was an octogenarian, I have thrown the fly, caught trout, and enjoyed a delightful day of angling and social amusement, in the shady green meadows by the bright clear streams of the Wandle.

* Benjamin West.

CONSOLATIONS IN TRAVEL;

OR,

THE LAST DAYS OF A PHILOSOPHER.

ADVERTISEMENT

TO

THE FIRST EDITION.

[As is stated in the Preface which follows, this work was composed during a period of bodily indisposition;—it was concluded at the very moment of the invasion of the Author's last illness. Had his life been prolonged, it is probable, that some additions and some changes would have been made. The editor does not consider himself warranted to do more than give to the world a faithful copy, making only a few omissions and a few verbal alterations. The characters of the persons of the Dialogues were intended to be ideal, at least in great part;—such they should be considered by the reader; and, it is to be hoped, that the incidents introduced, as well as the persons, will be viewed only as subordinate and subservient to the sentiments and doctrines. The dedication, it may be specially noticed, is the author's own, and in the very words dictated by him, at a time when he had lost the power of writing except with extreme difficulty, owing to the paralytic attack, although he retained in a very remarkable manner all his mental faculties unimpaired and unclouded.

J. D.]

London,
January 6th, 1830.

TO
THOMAS POOLE, ESQ.,
OF NETHER STOWEY,
IN REMEMBRANCE OF
THIRTY YEARS OF CONTINUED AND FAITHFUL
FRIENDSHIP.

PREFACE.

SALMONIA was written during the time of a partial recovery from a long and dangerous illness. The present work was composed immediately after, under the same unfavourable and painful circumstances, and at a period when the constitution of the author suffered from new attacks. He has derived some pleasure and some consolation, when most other sources of consolation and pleasure were closed to him, from this exercise of his mind; and, he ventures to hope that these hours of sickness may be not altogether unprofitable to persons in perfect health.

Rome,
February 21, 1829.

CONSOLATIONS IN TRAVEL,

OR

THE LAST DAYS OF A PHILOSOPHER.

DIALOGUE THE FIRST.

THE VISION.

I PASSED the autumn and the early winter of the years 18— and 18— at Rome. The society was, as is usual in that metropolis of the old Christian world, numerous and diversified. In it there were found many intellectual foreigners, and amongst them some distinguished Britons, who had a higher object in making this city their residence than mere idleness or vague curiosity. Amongst these my countrymen there were two gentlemen with whom I formed a particular intimacy, and who were my frequent companions in the visits which I made to the monuments of the grandeur of the old Romans, and to the master-pieces of ancient and modern art. One of them I shall call Ambrosio: he was a man of highly cultivated taste, great classical erudition and minute historical knowledge. In religion he was of the Roman Catholic persuasion; but a Catholic of the most liberal school, who in another age might have been secretary to Ganganelli. His views upon the subjects

of politics and religion were enlarged ; but his leaning was rather to the power of a single magistrate than to the authority of a democracy or even of an oligarchy. The other friend, whom I shall call Onuphrio, was a man of a very different character. Belonging to the English aristocracy, he had some of the prejudices usually attached to birth and rank ; but his manners were gentle, his temper good and his disposition amiable. Having been partly educated at a northern university in Britain, he had adopted views in religion which went even beyond toleration, and which might be regarded as entering the verge of scepticism. For a patrician he was very liberal in his political views. His imagination was poetical and discursive, his taste good, and his tact extremely fine, so exquisite, indeed, that it sometimes approached to morbid sensibility, and disgusted him with slight defects, and made him keenly sensible of small perfections, to which common minds would have been indifferent.

In the beginning of October, on a very fine afternoon, I drove with these two friends to the Colosseum, a monument which for the hundredth time even, I had viewed with a new admiration ; my friends partook of my sentiments. I shall give the conversation which occurred there in their own words. Onuphrio said, "How impressive are those ruins ! — what a character do they give us of the ancient Romans, what magnificence of design, what grandeur of execution ! Had we not historical documents to inform us of the period when this structure was raised, and of the purposes for which it was designed, it might be imagined the work of a race of giants, a council chamber for those Titans fabled to have warred against the gods of the pagan mythology. The size of the masses of travertine of

which it is composed, is in harmony with the immense magnitude of the building. It is hardly to be wondered at that a people which constructed such works for their daily sports, for their usual amusements, should have possessed strength, enduring energy and perseverance sufficient to enable them to conquer the world. They appear always to have formed their plans, and made their combinations as if their power were beyond the reach of chance, independent of the influence of time, and founded for unlimited duration—for eternity !”

Ambrosio took up the discourse of Onuphrio, and said, “The aspect of this wonderful heap of ruins is so picturesque, that it is impossible to regret its decay ; and at this season of the year the colours of the vegetation are in harmony with those of the falling ruins, and how perfectly the whole landscape is in tone ! The remains of the palace of the Cæsars and of the golden halls of Nero appear in the distance, their gray and tottering turrets, and their moss-stained arches reposing, as it were, upon the decaying vegetation : and there is nothing that marks the existence of life except the few pious devotees, who wander from station to station in the arena below, kneeling before the cross, and demonstrating the triumph of a religion, which received in this very spot in the early period of its existence one of its most severe persecutions, and which, nevertheless, has preserved what remains of that building, where attempts were made to stifle it almost at its birth ; for, without the influence of Christianity, these majestic ruins would have been dispersed or levelled to the dust. Plundered of their lead and iron by the barbarians, Goths, and Vandals, and robbed even of their stones by Roman princes, the Barberini, they owe what remains of their relics to the sanctifying influence of that faith

which has preserved for the world all that was worth preserving, not merely arts and literature, but likewise that which constitutes the progressive nature of intellect, and the institutions which afford to us happiness in this world and hopes of a blessed immortality in the next. And, being of the faith of Rome, I may say, that the preservation of this pile by the sanctifying effect of a few crosses planted round it, is almost a miraculous event. And what a contrast the present application of this building, connected with holy feelings and exalted hopes, is to that of the ancient one, when it was used for exhibiting to the Roman people the destruction of men by wild beasts, or of men, more savage than wild beasts, by each other, to gratify a horrible appetite for cruelty, founded upon a still more detestable lust, that of universal domination! and who would have supposed, in the time of Titus, that a faith, despised in its insignificant origin, and persecuted from the supposed obscurity of its founder and its principles, should have reared a dome to the memory of one of its humblest teachers, more glorious than was ever framed for Jupiter or Apollo in the ancient world, and have preserved even the ruins of the temples of the pagan deities, and have burst forth in splendour and majesty, consecrating truth amidst the shrines of error, employing the idols of the Roman superstition for the most holy purposes, and rising a bright and constant light amidst the dark and starless night which followed the destruction of the Roman empire!"

Onuphrio now resumed the discourse: he said, "I have not the same exalted views on the subject which our friend Ambrosio has so eloquently expressed. Some little of the perfect state in which these ruins exist may have been owing to causes which he has described; but

these causes have only lately begun to operate, and the mischief was done before Christianity was established at Rome. Feeling differently on these subjects, I admire this venerable ruin rather as the record of the destruction of the power of the greatest people that ever existed, than as a proof of the triumph of Christianity; and I am carried forward in melancholy anticipation, to the period when even the magnificent dome of St. Peter's will be in a similar state to that which the Colosseum now is, and when its ruins may be preserved by the sanctifying influence of some new and unknown faith; when, perhaps, the statue of Jupiter, which at present receives the kiss of the devotee, as the image of St. Peter, may be employed for another holy use, as the personification of a future saint or divinity; and when the monuments of the papal magnificence shall be mixed with the same dust as that which now covers the tombs of the Cæsars. Such, I am sorry to say, is the general history of all the works and institutions belonging to humanity. They rise, flourish, and then decay and fall; and the period of their decline is generally proportional to that of their elevation. In ancient Thebes or Memphis the peculiar genius of the people has left us monuments from which we can judge of their arts, though we cannot understand the nature of their superstitions. Of Babylon and of Troy the remains are almost extinct; and what we know of these famous cities is almost entirely derived from literary records. Ancient Greece and Rome we view in the few remains of their monuments; and the time will arrive when modern Rome shall be what ancient Rome now is; and ancient Rome and Athens will be what Tyre or Carthage now are, known only by coloured dust in the desert, or coloured sand, containing the

fragments of bricks or glass, washed up by the waves of a stormy sea. I might pursue these thoughts still further, and show that the wood of the cross, or the bronze of the statue, decay as quickly as if they had not been sanctified; and I think I could show that their influence is owing to the imagination, which, when infinite time is considered, or the course of ages even, is null and its effect imperceptible; and similar results occur, whether the faith be that of Osiris, of Jupiter, of Jehovah, or of Jesus."

To this Ambrosio replied, his countenance, and the tones of his voice, expressing some emotion: "I do not think, Onuphrio, that you consider this question with your usual sagacity or acuteness; indeed, I never hear you on the subject of religion without pain and without a feeling of regret, that you have not applied your powerful understanding to a more minute and correct examination of the evidences of religion. You would then, I think, have seen, in the origin, progress, elevation, decline and fall of the empires of antiquity, proofs that they were intended for a definite end in the scheme of human redemption; you would have found prophecies which have been amply verified; and the foundation or the ruin of a kingdom, which appears in civil history so great an event, in the history of man, in his religious institutions, as comparatively of small moment: you would have found the establishment of the worship of one God amongst a despised and contemned people as the most important circumstance in the history of the early world; you would have found the Christian dispensation naturally arising out of the Jewish, and the doctrines of the pagan nations, all preparatory to the triumph and final establishment of a creed fitted for the

most enlightened state of the human mind, and equally adapted to every climate and every people."

To this animated appeal of Ambrosio, Onuphrio replied in the most tranquil manner, and with the air of an unmoved philosopher:—"You mistake me, Ambrosio, if you consider me as hostile to Christianity. I am not of the school of the French encyclopædists, or of the English infidels. I consider religion as essential to man, and belonging to the human mind in the same manner as instincts belong to the brute creation, a light, if you please, of revelation to guide him through the darkness of this life, and to keep alive his undying hope of immortality: but pardon me if I consider this instinct as equally useful in all its different forms, and still a divine light through whatever medium or cloud of human passion or prejudice it passes. I reverence it in the followers of Bramah, in the disciple of Mahomet, and I wonder at it, in all the variety of forms it adopts in the Christian world. You must not be angry with me that I do not allow infallibility to your church, having been myself brought up by Protestant parents, who were rigidly attached to the doctrines of Calvin."

I saw Ambrosio's countenance kindle at Onuphrio's explanation of his opinions, and he appeared to be meditating an angry reply. I endeavoured to change the conversation to the state of the Colosseum, with which it had begun. "These ruins," I said, "as you have both observed, are highly impressive; yet when I saw them six years ago, they had a stronger effect on my imagination, whether it was the charm of novelty, or that my mind was fresher, or that the circumstances under which I saw them were peculiar, I know not, but probably all these causes operated in affecting my mind. It was a still and beautiful evening in the end of May;

the last sun-beams were dying away in the western sky, and the first moon-beams shining in the eastern; the bright orange tints lighted up the ruins, and, as it were, kindled the snows that still remained on the distant Apennines, which were visible from the highest accessible part of the amphitheatre. In this glow of colouring, the green of advanced spring softened the gray and yellow tints of the decaying stones, and as the lights gradually became fainter, the masses appeared grander and more gigantic; and when the twilight had entirely disappeared, the contrast of light and shade in the beams of the full moon, and beneath a sky of the brightest sapphire, but so highly illuminated, that only Jupiter and a few stars of the first magnitude were visible, gave a solemnity and magnificence to the scene which awakened the highest degree of that emotion which is so properly termed the sublime. The beauty and the permanency of the heavens and the principle of conservation belonging to the system of the universe, the works of the Eternal and Divine Architect, were finely opposed to the perishing and degraded works of man in his most active and powerful state. And at this moment so humble appeared to me the condition of the most exalted beings belonging to the earth, so feeble their combinations, so minute the point of space, and so limited the period of time in which they act, that I could hardly avoid comparing the generations of man, and the effects of his genius and power, to the swarms of *lucoli*, or fire-flies, which were dancing around me, and that appeared flitting and sparkling amidst the gloom and darkness of the ruins, but which were no longer visible when they rose above the horizon, their feeble light being lost and utterly obscured in the brightness of the moon-beams in the heavens."

Onuphrio said: "I am not sorry that you have changed the conversation. You have given us the history of a most interesting recollection, and well expressed a solemn though humiliating feeling. In such moments and among such scenes, it is impossible not to be struck with the nothingness of human glory, and the transiency of human works. This, one of the greatest monuments on the face of the earth, was raised by a people, then its masters, only seventeen centuries ago; in a few ages more it will be but as dust, and of all the testimonials of the vanity or power of man, whether raised to immortalize his name, or to contain his decaying bones without a name, no one is known to have a duration beyond what is measured by the existence of a hundred generations; and it is only to multiply centuple, for instance, the period of time, and the memorials of a village and the monuments of a country church-yard may be compared with those of an empire and the remains of the world."

Ambrosio, to whom the conversation seemed disagreeable, put us in mind of an engagement we had made to spend the evening at the conversazione of a celebrated lady, and proposed to call the carriage. The reflections which the conversation and the scene had left in my mind little disposed me for general society. I requested them to keep their engagement, and said I was resolved to spend an hour amidst the solitude of the ruins, and desired them to send back the carriage for me. They left me, expressing a hope that my poetical or melancholy fancy might not be the occasion of a cold, and wished me the company of some of the spectres of the ancient Romans.

When I was left alone, I seated myself in the moonshine, on one of the steps leading to the seats supposed

to have been occupied by the patricians in the Colosseum at the time of the public games. The train of ideas in which I had indulged before my friends left me continued to flow with a vividness and force increased by the stillness and solitude of the scene; and the full moon has always a peculiar effect on these moods of feeling in my mind, giving to them a wildness and a kind of indefinite sensation, such as I suppose belong at all times to the true poetical temperament. It must be so, I thought to myself;—no new city will rise again out of the double ruins of this;—no new empire will be founded upon these colossal remains of that of the old Romans. The world, like the individual, flourishes in youth, rises to strength in manhood, falls to decay in age; and the ruins of an empire are like the decrepit frame of an individual, except that they have some tints of beauty which nature bestows upon them. The sun of civilization arose in the East, advanced towards the West, and is now at its meridian;—in a few centuries more it will probably be seen sinking below the horizon even in the new world, and there will be left darkness only where there is a bright light, deserts of sand where there were populous cities, and stagnant morasses where the green meadow or the bright corn-field once appeared. I called up images of this kind in my imagination. “Time,” I said, “which purifies, and as it were sanctifies the mind, destroys and brings into utter decay the body; and, even in nature, its influence seems always degrading. She is represented by the poets as eternal in her youth, but amongst these ruins she appears to me eternal in her age, and here no traces of renovation appear in the ancient of days.” I had scarcely concluded this ideal sentence, when my reverie became deeper, the ruins surrounding me appeared to

vanish from my sight, the light of the moon became more intense, and the orb itself seemed to expand into a flood of splendour. At the same time that my visual organs appeared so singularly affected, the most melodious sounds filled my ear; softer, yet at the same time deeper and fuller, than I had ever heard in the most harmonious and perfect concert. It appeared to me that I had entered a new state of existence; and I was so perfectly lost in the new kind of sensation which I experienced, that I had no recollections and no perceptions of identity. On a sudden the music ceased, but the brilliant light still continued to surround me, and I heard a low, but extremely distinct and sweet voice, which appeared to issue from the centre of it. The sounds were at first musical, like those of a harp, but they soon became articulate, as if a prelude to some piece of sublime poetical composition. "You, like all your brethren," said the voice, "are entirely ignorant of every thing belonging to yourselves, the world you inhabit, your future destinies, and the scheme of the universe; and yet you have the folly to believe you are acquainted with the past, the present, and the future. I am an intelligence somewhat superior to you, though there are millions of beings as much above me in power and in intellect, as man is above the meanest and weakest reptile that crawls beneath his feet;—yet something I can teach you: yield your mind wholly to the influence which I shall exert upon it, and you shall be undeceived in your views of the history of the world, and of the system you inhabit." At this moment the bright light disappeared, the sweet and harmonious voice, which was the only proof of the presence of a superior intelligence, ceased: I was in utter darkness and silence, and seemed to myself to be carried rapidly

upon a stream of air, without any other sensation than that of moving quickly through space. Whilst I was still in motion, a dim and hazy light, which seemed like that of twilight in a rainy morning, broke upon my sight, and gradually a country displayed itself to my view, covered with forests and marshes. I saw wild animals grazing in large savannahs, and carnivorous beasts, such as lions and tigers, occasionally disturbing and destroying them: I saw naked savages feeding upon wild fruits, or devouring shell-fish, or fighting with clubs for the remains of a whale which had been thrown upon the shore. I observed that they had no habitations, that they concealed themselves in caves, or under the shelter of palm-trees,—and that the only delicious food which nature seemed to have given to them, was the date and the cocoa-nut,—and these were in very small quantities, and the object of contention. I saw that some few of these wretched human beings that inhabited the wide waste before my eyes, had weapons pointed with flint or fish bone, which they made use of for destroying birds, quadrupeds, or fishes, that they fed upon raw; but their greatest delicacy appeared to be a maggot or worm, which they sought for with great perseverance in the buds of the palm. When I had cast my eyes on the varied features of this melancholy scene, which was now lighted by a rising sun, I heard again the same voice which had astonished me in the Colosseum, and which said,—“See the birth of Time! Look at man in his newly-created state, full of youth and vigour. Do you see aught in this state, to admire or envy?” As the last words fell on my ear, I was again, as before, rapidly put in motion, and I seemed, again resistless, to be hurried upon a stream of air, and again in perfect darkness. In a moment an indistinct light again appeared before

my eyes, and a country opened upon my view, which appeared partly wild, and partly cultivated; there were fewer woods and morasses, than in the scene which I had just before seen; I beheld men who were covered with the skins of animals, and who were driving cattle to enclosed pastures; I saw others who were reaping and collecting corn, others who were making it into bread; I saw cottages furnished with many of the conveniences of life, and a people in that state of agricultural and pastoral improvement, which has been imagined by the poets as belonging to the golden age. The same voice, which I shall call that of the Genius, said,—“Look at these groups of men who are escaped from the state of infancy: they owe their improvement to a few superior minds still amongst them. That aged man, whom you see with a crowd around him, taught them to build cottages; from that other, they learnt to domesticate cattle; from others, to collect and sow corn and seeds of fruit. And these arts will never be lost; another generation will see them more perfect; the houses, in a century more, will be larger and more convenient; the flocks of cattle more numerous: the corn-fields more extensive; the morasses will be drained, the number of fruit-trees increased. You shall be shown other visions of the passages of time,—but as you are carried along the stream which flows from the period of creation to the present moment, I shall only arrest your transit to make you observe some circumstances which will demonstrate the truths I wish you to know, and which will explain to you the little it is permitted me to understand of the scheme of the universe.” I again found myself in darkness and in motion, and I was again arrested by the opening of a new scene upon my eyes. I shall describe this scene and the others in

the succession in which they appeared before me, and the observations by which they were accompanied in the voice of the wonderful being who appeared as my intellectual guide. In the scene which followed that of the agricultural or pastoral people, I saw a great extent of cultivated plains; large cities on the sea-shore, palaces, forums, and temples ornamenting them; men associated in groups, mounted on horses, and performing military exercises; galleys moved by oars on the ocean; roads intersecting the country covered with travellers and containing carriages moved by men or horses. The Genius now said, "You see the early state of civilization of man; the cottages of the last race you beheld, have become improved into stately dwellings, palaces, and temples, in which use is combined with ornament. The few men to whom, as I said before, the foundations of these improvements were owing, have had divine honours paid to their memory. But look at the instruments belonging to this generation, and you will find that they are only of brass. You see men who are talking to crowds around them, and others who are apparently amusing listening groups by a kind of song or recitation; these are the earliest bards and orators; but all their signs of thought are oral, for written language does not yet exist." The next scene which appeared, was one of varied business and imagery. I saw a man, who bore in his hands the same instruments as our modern smith's, presenting a vase, which appeared to be made of iron, amidst the acclamations of an assembled multitude, engaged in triumphal procession before the altars, dignified by the name of Apollo at Delphi; and I saw in the same place men who carried rolls of papyrus in their hands, and wrote upon them with reeds containing ink made from the soot of wood mixed with a so-

lution of glue. "See," the Genius said, "an immense change produced in the condition of society, by the two arts of which you here see the origin; the one, that of rendering iron malleable, which is owing to a single individual, an obscure Greek; the other, that of making thought permanent in written characters, an art which has gradually arisen from the hieroglyphics which you may observe on yonder pyramids. You will now see human life replete with power and activity." Again, another scene broke upon my vision. I saw the bronze instruments, which had belonged to the former state of society, thrown away: malleable iron converted into hard steel; this steel applied to a thousand purposes of civilized life;—I saw bands of men who made use of it for defensive armour, and for offensive weapons; I saw these iron-clad men, in small numbers, subduing thousands of savages, and establishing amongst them their arts and institutions; I saw a few men, on the eastern shores of Europe, resisting, with the same materials, the united forces of Asia; I saw a chosen band die in defence of their country, destroyed by an army a thousand times as numerous; and I saw this same army, in its turn, caused to disappear, and destroyed or driven from the shores of Europe, by the brethren of that band of martyred patriots; I saw bodies of these men traversing the sea, founding colonies, building cities, and wherever they established themselves, carrying with them their peculiar arts. Towns and temples arose containing schools, and libraries filled with the rolls of the papyrus. The same steel, such a tremendous instrument of power in the hands of the warrior, I saw applied, by the genius of the artist, to strike forms, even more perfect than those of life, out of the rude marble; and I saw the walls of the palaces and temples covered

with pictures, in which historical events were portrayed with the truth of nature and the poetry of mind. The voice now awakened my attention, by saying, "You have now before you the vision of that state of society, which is an object of admiration to the youth of modern times, and the recollections of which, and the precepts founded on these recollections, constitute an important part of your education. Your maxims of war and policy, your taste in letters and the arts, are derived from models left by that people, or by their immediate imitators, whom you shall now see." I opened my eyes, and recognized the very spot in which I was sitting, when the vision commenced. I was on the top of an arcade, under a silken canopy, looking down upon the tens of thousands of people, who were crowded in the seats of the Colosseum, ornamented with all the spoils that the wealth of a world can give; I saw in the arena below animals of the most extraordinary kind, and which have rarely been seen living in modern Europe, the giraffe, the zebra, the rhinoceros, and the ostrich from the deserts of Africa beyond the Niger, the hippopotamus from the Upper Nile, and the royal tiger and the gnu from the banks of the Ganges. Looking over Rome, which, in its majesty of palaces and temples, and in its colossal aqueducts, bringing water even from the snows of the distant Apennines, seemed more like the creation of a supernatural power, than the work of human hands; looking over Rome, to the distant landscape, I saw the whole face, as it were, of the ancient world adorned with miniature images of this splendid metropolis. Where the Roman conquered, there he civilized; where he carried his arms, there he fixed likewise his household gods; and from the deserts of Arabia to the mountains of Caledonia, there appeared but one

people, having the same arts, language, and letters, all of Grecian origin. I looked again, and saw an entire change in the brilliant aspect of this Roman world; the people of conquerors and heroes was no longer visible; the cities were filled with an idle and luxurious population; those farms which had been cultivated by warriors, who left the plough to take the command of armies, were now in the hands of slaves; and the militia of free men were supplanted by bands of mercenaries, who sold the empire to the highest bidder. I saw immense masses of warriors collecting in the north and east, carrying with them no other proofs of cultivation, but their horses and steel arms; I saw these savages everywhere attacking this mighty empire, plundering cities, destroying the monuments of arts and literature, and, like wild beasts devouring a noble animal, tearing into pieces and destroying the Roman power. Ruin, desolation, and darkness were before me, and I closed my eyes to avoid the melancholy scene. "See," said the Genius, "the melancholy termination of a power believed by its founders invincible, and intended to be eternal. But you will find, though the glory and greatness belonging to its military genius have passed away, yet those belonging to the arts and institutions, by which it adorned and dignified life, will again arise in another state of society." I opened my eyes again, and I saw Italy recovering from her desolation; towns arising, with governments almost upon the model of ancient Athens and Rome, and these different small states rivals in arts and arms; I saw the remains of libraries, which had been preserved in monasteries and churches by a holy influence, which even the Goth and Vandal respected, again opened to the people; I saw Rome rising from her ashes, the fragments of statues

found amidst the ruins of her palaces and imperial villas, becoming the models for the regeneration of art; I saw magnificent temples raised in this city, become the metropolis of a new and Christian world, and ornamented with the most brilliant master-pieces of the arts of design; I saw a Tuscan city, as it were, contending with Rome for pre-eminence in the productions of genius; and the spirit awakened in Italy, spreading its influence from the south to the north. "Now," the Genius said, "society has taken its modern and permanent aspect. Consider for a moment its relations to letters and to arms, as contrasted with those of the ancient world." I looked, and saw, that in the place of the rolls of papyrus, libraries were now filled with books. "Behold," the Genius said, "the printing press; by the invention of Faust the productions of genius are, as it were, made imperishable, capable of indefinite multiplication, and rendered an unalienable heritage of the human mind. By this art, apparently so humble, the progress of society is secured, and man is spared the humiliation of witnessing again scenes like those which followed the destruction of the Roman empire. Now look to the warriors of modern times; you see the spear, the javelin, the shield and the cuirass, are changed for the musket and the light artillery. The German monk who discovered gunpowder, did not meanly affect the destinies of mankind; wars are become less bloody by becoming less personal, mere brutal strength is rendered of comparatively little avail; all the resources of civilization are required to maintain and move a large army; wealth, ingenuity and perseverance, become the principal elements of success; civilized man is rendered in consequence infinitely superior to the savage, and gunpowder gives perma-

nence to his triumph, and secures the cultivated nations from ever being again overrun by the inroads of millions of barbarians. There is so much identity of feature in the character of the two or three centuries that are just passed, that I wish you only to take a very transient view of the political and military events belonging to them. You will find attempts made by the chiefs of certain great nations to acquire predominance and empire; you will see those attempts, after being partially successful, resisted by other nations, and the balance of power, apparently for a moment broken, again restored. Amongst the rival nations that may be considered as forming the republic of modern Europe, you will see one pre-eminent for her maritime strength and colonial and commercial enterprize, and you will find she retains her superiority only because it is favourable to the liberty of mankind. But you must not yet suffer the vision of modern Europe to pass from your eyes without viewing some other results of the efforts of men of genius, which, like those of gunpowder and the press, illustrate the times to which they belong and form brilliant epochs in the history of the world. If you look back into the schools of regenerated Italy, you will see in them the works of the Greek masters of philosophy, and if you attend to the science taught in them you will find it vague, obscure, and full of erroneous notions. You will find in this early period of improvement branches of philosophy even applied to purposes of delusion; the most sublime of the departments of human knowledge, astronomy, abused by impostors, who from the aspect of the planetary world pretended to predict the fortunes and destinies of individuals. You will see in the laboratories alchemists searching for an universal medicine, or elixir of life, and for the

philosopher's stone, or a method of converting all metals into gold; but unexpected and useful discoveries you will find even in this age arise amidst the clouds of deception and the smoke of the furnace: delusion and error vanish and pass away, and truths seized upon by a few superior men become permanent, and the property of an enlightening world. Amongst the personages who belong to this early period, there are two whom I must request you to notice, one an Englishman who pointed out the path to the discovery of scientific truths, and the other a Tuscan, who afforded the happiest experimental illustrations of the speculative views of his brother in science. You will see academies formed a century later in Italy, France, and Britain, in which the sciences are enlarged by new and varied experiments, and the true system of the universe, developed by an illustrious Englishman, taught and explained. The practical results of the progress of physics, chemistry and mechanics, are of the most marvellous kind, and to make them all distinct would require a comparison of ancient and modern states: ships that were moved by human labour in the ancient world are transported by the winds; and a piece of steel, touched by the magnet, points to the mariner his unerring course from the old to the new world; and by the exertions of one man of genius, aided by the resources of chemistry, a power which, by the old philosophers could hardly have been imagined, has been generated and applied to almost all the machinery of active life; the steam-engine performs not only the labour of horses, but of man, by combinations which appear almost possessed of intelligence; waggons are moved by it, constructions made, vessels caused to perform voyages in opposition to wind and tide, and a

power placed in human hands which seems almost unlimited. To these novel and still extending improvements may be added others, which, though of a secondary kind, yet materially affect the comforts of life, the collecting from fossil materials the elements of combustion, and applying them so as to illuminate, by a single operation, houses, streets, and even cities. If you look to the results of chemical arts, you will find new substances of the most extraordinary nature applied to various novel purposes; you will find a few experiments in electricity leading to the marvellous result of disarming the thunder-cloud of its terrors, and you will see new instruments created by human ingenuity, possessing the same powers as the electrical organs of living animals. To whatever part of the vision of modern times you cast your eyes you will find marks of superiority and improvement, and I wish to impress upon you the conviction, that the results of intellectual labour, or of scientific genius, are permanent and incapable of being lost. Monarchs change their plans, governments their objects, a fleet or an army effect their purpose and then pass away; but a piece of steel touched by the magnet, preserves its character for ever, and secures to man the dominion of the trackless ocean. A new period of society may send armies from the shores of the Baltic to those of the Euxine, and the empire of the followers of Mahomet may be broken in pieces by a northern people, and the dominion of the Britons in Asia may share the fate of that of Tamerlane or Zengiskhan; but the steam-boat which ascends the Delaware or the St. Lawrence will continue to be used, and will carry the civilization of an improved people into the deserts of North America and into the wilds of Canada. In the common history of the world, as compiled by authors in general,

almost all the great changes of nations are confounded with changes in their dynasties, and events are usually referred either to sovereigns, chiefs, heroes, or their armies, which do in fact originate from entirely different causes, either of an intellectual or moral nature. Governments depend far more than is generally supposed upon the opinion of the people, and the spirit of the age and nation. It sometimes happens that a gigantic mind possesses supreme power, and rises superior to the age in which he is born, such was Alfred in England, and Peter in Russia; but such instances are very rare; and, in general, it is neither amongst sovereigns nor the higher classes of society, that the great improvers or benefactors of mankind, are to be found. The works of the most illustrious names were little valued at the times when they were produced, and their authors either despised or neglected; and great, indeed, must have been the pure and abstract pleasure resulting from the exertion of intellectual superiority, and the discovery of truth, and the bestowing benefits and blessings upon society, which induced men to sacrifice all their common enjoyments, and all their privileges as citizens, to these exertions. Anaxagoras, Archimedes, Roger Bacon, Gallileo Gallilei, in their deaths or their imprisonments, offer instances of this kind; and nothing can be more striking, than what appears to have been the ingratitude of men towards their greatest benefactors; but hereafter, when you understand more of the scheme of the universe, you will see the cause and the effect of this,—and you will find the whole system governed by principles of immutable justice. I have said that, in the progress of society, all great and real improvements are perpetuated; the same corn which, four thousand years ago, was raised from an improved grass by an inventor,

worshipped for two thousand years, in the ancient world, under the name of Ceres, still forms the principal food of mankind; and the potatoe, perhaps the greatest benefit that the old has derived from the new world, is spreading over Europe, and will continue to nourish an extensive population, when the name of the race by whom it was first cultivated in South America, is forgotten.

“I will now call your attention to some remarkable laws belonging to the history of society, and from the consideration of which you will be able gradually to develope the higher and more exalted principles of being. There appears nothing more accidental than the sex of an infant, yet take any great city or any province, and you will find that the relations of males and females are unalterable. Again, a part of the pure air of the atmosphere is continually consumed in combustion and respiration; living vegetables emit this principle during their growth; nothing appears more accidental than the proportion of vegetable to animal life on the surface of the earth, yet they are perfectly equivalent, and the balance of the sexes, like the constitution of the atmosphere, depends upon the principles of an unerring intelligence. You saw, in the decline of the Roman empire, a people enfeebled by luxury, worn out by excess, overrun by rude warriors; you saw the giants of the North and East mixing with the pigmies of the South and West. An empire was destroyed, but the seeds of moral and physical improvement in the new race were sown; the new population resulting from the alliances of the men of the North with the women of the south was more vigorous, more full of physical power and more capable of intellectual exertion than their apparently ill suited progenitors; and the moral

effects or final causes of the migration of races, the plans of conquest and ambition which have led to revolutions and changes of kingdoms designed by man for such different objects, have been the same in their ultimate results,—that of improving by mixture the different families of men. An Alaric or an Attila, who marches with legions of barbarians for some gross view of plunder or ambition, is an instrument of divine power to effect a purpose of which he is wholly unconscious,—he is carrying a strong race to improve a weak one, and giving energy to a debilitated population; and the deserts he makes in his passage will become in another age cultivated fields, and the solitude he produces will be succeeded by a powerful and healthy population. The results of these events in the moral and political world may be compared to those produced in the vegetable kingdom by the storms and heavy gales so usual at the vernal equinox, the time of the formation of the seed; the pollen or farina of one flower is thrown upon the pistil of another, and the crossing of varieties of plants so essential to the perfection of the vegetable world produced. In man, moral causes and physical ones modify each other; the transmission of hereditary qualities to offspring is distinct in the animal world, and in the case of disposition to disease it is sufficiently obvious in the human being. But it is likewise a general principle, that powers or habits acquired by cultivation are transmitted to the next generation and exalted or perpetuated; the history of particular races of men affords distinct proofs of this. The Caucasian stock has always preserved its superiority, whilst the negro or flat-nosed race has always been marked by want of intellectual power and capacity for the arts of life. This last race, in fact, has never been cultivated, and a hundred generations, suc-

cessively improved, would be required to bring it to the state in which the Caucasian race was at the time of the formation of the Greek republics. The principle of the improvement of the character of races by the transmission of hereditary qualities has not escaped the observations of the legislators of the ancient people. By the divine law of Moses, the Israelites were enjoined to preserve the purity of their blood, and there was no higher crime than that of forming alliances with the idolatrous nations surrounding them. The Bramins of Hindostan have established, upon the same principle, the law of caste, by which certain professions were made hereditary. In this warm climate, where labour is so oppressive, to secure perfection in any series of operations, it seems essential to strengthen the powers by the forces acquired from this principle of hereditary descent. It will at first, perhaps, strike your mind, that the mixing or blending of races is in direct opposition to this principle of perfection; but here I must require you to pause and consider the nature of the qualities belonging to the human being. Excess of a particular power, which is in itself a perfection, becomes a defect; the organs of touch may be so refined as to show a diseased sensibility; the ear may become so exquisitely sensitive as to be more susceptible to the uneasiness produced by discords than to the pleasures of harmony. In the nations which have been long civilized, the defects are generally those dependent on excess of sensibility,—defects which are cured in the next generation by the strength and power belonging to a ruder tribe. In looking back upon the vision of ancient history, you will find that there never has been an instance of a migration to any extent of any race but the Caucasian, and they have usually passed from the North to the South. The negro race has always been driven

before these conquerors of the world; and the red men, the aborigines of America, are constantly diminishing in number, and it is probable that in a few centuries more their pure blood will be entirely extinct. In the population of the world, the great object is evidently to produce organized frames most capable of the happy and intellectual enjoyment of life,—to raise man above the mere animal state. To perpetuate the advantages of civilization, the races most capable of these advantages are preserved and extended, and no considerable improvement made by an individual is ever lost to society. You see living forms perpetuated in the series of ages, and apparently the quantity of life increased. In comparing the population of the globe as it now is with what it was centuries ago, you would find it considerably greater; and if the quantity of life is increased, the quantity of happiness, particularly that resulting from the exercise of intellectual power, is increased in a still higher ratio. Now, you will say, *is mind generated, is spiritual power created*; or, are those results dependent upon the organization of matter, upon new perfections given to the machinery upon which thought and motion depend? I proclaim to you,” said the Genius, raising his voice from its low and sweet tone to one of ineffable majesty, “neither of these opinions is true. Listen, whilst I reveal to you the mysteries of spiritual natures, but I almost fear that with the mortal veil of your senses surrounding you, these mysteries can never be made perfectly intelligible to your mind. Spiritual natures are eternal and indivisible, but their modes of being are as infinitely varied as the forms of matter. They have no relation to space, and, in their transition, no dependence upon time, so that they can pass from one part of the universe to another

by laws entirely independent of their motion. The quantity or the number of spiritual essences, like the quantity or number of the atoms of the material world, are always the same; but their arrangements, like those of the materials which they are destined to guide or govern, are infinitely diversified; they are, in fact, parts more or less inferior of the infinite mind, and in the planetary systems, to one of which this globe you inhabit belongs, are in a state of probation, continually aiming at, and generally rising to a higher state of existence. Were it permitted me to extend your vision to the fates of individual existences, I could show you the same spirit, which in the form of Socrates developed the foundations of moral and social virtue, in the Czar Peter possessed of supreme power and enjoying exalted felicity in improving a rude people. I could show you the monad or spirit, which with the organs of Newton displayed an intelligence almost above humanity, now in a higher and better state of planetary existence drinking intellectual light from a purer source and approaching nearer to the infinite and divine Mind. But prepare your mind, and you shall at least catch a glimpse of those states, which the highest intellectual beings that have belonged to the earth enjoy after death, in their transition to new and more exalted natures." The voice ceased, and I appeared in a dark, deep and cold cave, of which the walls of the Colosseum formed the boundary. From above, a bright and rosy light broke into this cave, so that whilst all below was dark, above all was bright and illuminated with glory. I seemed possessed at this moment of a new sense and felt that the light brought with it a genial warmth; odours like those of the most balmy flowers appeared to fill the air, and the sweetest sounds of music absorbed my sense

of hearing; my limbs had a new lightness given to them, so that I seemed to rise from the earth, and gradually mounted into the bright luminous air, leaving behind me the dark and cold cavern and the ruins with which it was strewed. Language is inadequate to describe what I felt in rising continually upwards through this bright and luminous atmosphere; I had not, as is generally the case with persons in dreams of this kind, imagined to myself wings, but I rose gradually and securely as if I were myself a part of the ascending column of light. By degrees this luminous atmosphere, which was diffused over the whole of space, became more circumscribed and extended only to a limited spot around me. I saw through it the bright blue sky, the moon and stars, and I passed by them as if it were in my power to touch them with my hand; I beheld Jupiter and Saturn as they appear through our best telescopes, but still more magnified, all the moons and belts of Jupiter being perfectly distinct, and the double ring of Saturn appearing in that state in which I have heard Herschel often express a wish he could see it. It seemed as if I was on the verge of the solar system, and my moving sphere of light now appeared to pause. I again heard the low and sweet voice of the Genius, which said, "You are now on the verge of your own system: will you go further, or return to the earth?" I replied, "I have left an abode which is damp, dreary, dark and cold; I am now in a place where all is life, light and enjoyment; show me, at least before I return, the glimpse which you promised me of those superior intellectual natures and the modes of their being and their enjoyments." "There are creatures far superior," said the Genius, "to any idea your imagination can form in that part of the system now

before you, comprehending Saturn, his moons and rings ; I will carry you to the verge of the immense atmosphere of this planet. In that space you will see sufficient to wonder at, and far more than with your present organization, it would be possible for me to make you understand." I was again in motion, and again almost as suddenly at rest. I saw below me a surface infinitely diversified, something like that of an immense glacier covered with large columnar masses, which appeared as if formed of glass, and from which were suspended rounded forms of various sizes, which, if they had not been transparent, I might have supposed to be fruit. From what appeared to me to be analogous to masses of bright blue ice, streams of the richest tint of rose-colour or purple burst forth and flowed into basins, forming lakes or seas of the same colour. Looking through the atmosphere towards the heavens I saw brilliant opaque clouds of an azure colour that reflected the light of the sun, which had to my eyes an entirely new aspect, and appeared smaller, as if seen through a dense blue mist. I saw moving on the surface below me immense masses, the forms of which I find it impossible to describe ; they had systems for locomotion similar to those of the morse or sea-horse, but I saw with great surprise that they moved from place to place by six extremely thin membranes, which they used as wings. Their colours were varied and beautiful, but principally azure and rose-colour ; I saw numerous convolutions of tubes, more analogous to the trunk of the elephant than to any thing else I can imagine, occupying what I supposed to be the upper parts of the body, and my feeling of astonishment almost became one of disgust, from the peculiar character of the organs of these singular beings ; and it was with a species of terror that I saw one of

them mounting upwards apparently flying towards those opaque clouds which I have before mentioned. "I know what your feelings are," said the Genius: "you want analogies and all the elements of knowledge to comprehend the scene before you. You are in the same state in which a fly would be whose microscopic eye was changed for one similar to that of man; and you are wholly unable to associate what you now see with your former knowledge. But, those beings who are before you, and who appear to you almost as imperfect in their functions as the zoophytes of the polar sea, to which they are not unlike in their apparent organization to your eyes, have a sphere of sensibility and intellectual enjoyment far superior to that of the inhabitants of your earth. Each of those tubes which appears like the trunk of an elephant, is an organ of peculiar motion or sensation; they have many modes of perception of which you are wholly ignorant, at the same time that their sphere of vision is infinitely more extended than yours, and their organs of touch far more perfect and exquisite. It would be useless for me to attempt to explain their organization, which you could never understand; but of their intellectual objects of pursuit I may perhaps give you some notion. They have used, modified and applied the material world in a manner analogous to man; but with far superior powers they have gained superior results. Their atmosphere being much denser than yours and the specific gravity of their planet less, they have been enabled to determine the laws belonging to the solar system with far more accuracy than you can possibly conceive, and any one of those beings could show you what is now the situation and appearance of your moon with a precision that would induce you to believe that he saw it, though his

knowledge is merely the result of calculation. Their sources of pleasure are of the highest intellectual nature. With the magnificent spectacle of their own rings and moons revolving round them,—with the various combinations required to understand and predict the relations of these wonderful phenomena, their minds are in unceasing activity and this activity is a perpetual source of enjoyment. Your view of the solar system is bounded by Uranus, and the laws of this planet form the ultimatum of your mathematical results; but these beings catch a sight of planets belonging to another system, and even reason on the phenomena presented by another sun. Those comets, of which your astronomical history is so imperfect, are to them perfectly familiar, and in their ephemerides their places are shown with as much accurateness as those of Jupiter or Venus in your almanacs. The parallax of the fixed stars nearest them is as well understood as that of their own sun, and they possess a magnificent history of the changes taking place in the heavens, and which are governed by laws that it would be vain for me to attempt to give you an idea of. They are acquainted with the revolutions and uses of comets; they understand the system of those meteoric formations of stones which have so much astonished you on earth; and they have histories in which the gradual changes of *nebulæ* in their progress towards systems have been registered, so that they can predict their future changes. And their astronomical records are not like yours, which go back only twenty centuries to the time of Hipparchus; they embrace a period a hundred times as long, and their civil history for the same time is as correct as their astronomical one. As I cannot describe to you the organs of these wonderful beings, so neither

can I show to you their modes of life ; but as their highest pleasures depend upon intellectual pursuits, so you may conclude that those modes of life bear the strictest analogy to that which on the earth you would call exalted virtue. I will tell you however that they have no wars, and that the objects of their ambition are entirely those of intellectual greatness, and that the only passion that they feel, in which comparisons with each other can be instituted, are those dependent upon a love of glory of the purest kind. If I were to show you the different parts of the surface of this planet, you would see marvellous results of the powers possessed by these highly intellectual beings and of the wonderful manner in which they have applied and modified matter. Those columnar masses, which seem to you as if arising out of a mass of ice below, are results of art, and processes are going on in them connected with the formation and perfection of their food. The brilliant coloured fluids are the results of such operations as on the earth would be performed in your laboratories, or more properly in your refined culinary apparatus, for they are connected with their system of nourishment. Those opaque azure clouds, to which you saw a few minutes ago one of those beings directing his course, are works of art and places in which they move through different regions of their atmosphere and command the temperature and the quantity of light most fitted for their philosophical researches, or most convenient for the purposes of life. On the verge of the visible horizon which we perceive around us, you may see in the east a very dark spot or shadow, in which the light of the sun seems entirely absorbed ; this is the border of an immense mass of liquid analogous to your ocean, but unlike your sea it is inhabited by a race of intellectual beings inferior indeed

to those belonging to the atmosphere of Saturn, but yet possessed of an extensive range of sensations and endowed with extraordinary power and intelligence. I could transport you to the different planets and show you in each, peculiar intellectual beings bearing analogies to each other, but yet all different in power and essence. In Jupiter you would see creatures similar to those in Saturn, but with different powers of locomotion; in Mars and Venus you would find races of created forms more analogous to those belonging to the earth; but in every part of the planetary system you will find one character peculiar to all intelligent natures, a sense of receiving impressions from light by various organs of vision, and towards this result you cannot but perceive that all the arrangements and motions of the planetary bodies, their satellites and atmospheres are subservient. The spiritual natures therefore that pass from system to system in progression towards power and knowledge preserve at least this one invariable character, and their intellectual life may be said to depend more or less upon the influence of light. As far as my knowledge extends, even in other parts of the universe the more perfect organized systems still possess this source of sensation and enjoyment; but with higher natures, finer and more ethereal kinds of matter are employed in organization, substances that bear the same analogy to common matter that the refined or most subtle gases do to common solids and fluids. The universe is every where full of life, but the modes of this life are infinitely diversified, and yet every form of it must be enjoyed and known by every spiritual nature before the consummation of all things. You have seen the comet moving with its immense train of light through the sky; this likewise has a system supplied with living

beings, and their existence derives its enjoyment from the diversity of circumstances to which they are exposed ; passing as it were through the infinity of space, they are continually gratified by the sight of new systems and worlds, and you can imagine the unbounded nature of the circle of their knowledge. My power extends so far as to afford you a glimpse of the nature of a cometary world." I was again in rapid motion, again passing with the utmost velocity through the bright blue sky, and I saw Jupiter and his satellites and Saturn and his ring behind me, and before me the sun, no longer appearing as through a blue mist, but in bright and insupportable splendour, towards which I seemed moving with the utmost velocity. In a limited sphere of vision, in a kind of red hazy light similar to that which first broke in upon me in the Colosseum, I saw moving round me globes which appeared composed of different kinds of flame and of different colours. In some of these globes I recognized figures which put me in mind of the human countenance, but the resemblance was so awful and unnatural that I endeavoured to withdraw my view from them. " You are now," said the genius, " in a cometary system ; those globes of light surrounding you, are material forms, such as in one of your systems of religious faith have been attributed to seraphs : they live in that element which to you would be destruction ; they communicate by powers which would convert your organized frame into ashes ; they are now in the height of their enjoyment being about to enter into the blaze of the solar atmosphere. These beings so grand, so glorious, with functions to you incomprehensible, once belonged to the earth ; their spiritual natures have risen through different stages of planetary life, leaving their dust behind them,

carrying with them only their intellectual power. You ask me if they have any knowledge or reminiscence of their transitions; tell me of your own recollections in the womb of your mother, and I will answer you. It is the law of divine wisdom that no spirit carries with it into another state and being any habit or mental qualities except those which may be connected with its new wants or enjoyments; and knowledge relating to the earth would be no more useful to these glorified beings than their earthly system of organized dust, which would be instantly resolved into its ultimate atoms at such a temperature; even on the earth the butterfly does not transport with it into the air the organs or the appetites of the crawling worm from which it sprung. There is however one sentiment or passion which the monad or spiritual essence carries with it into all its stages of being, and which in these happy and elevated creatures is continually exalted—the love of knowledge or of intellectual power, which is in fact in its ultimate and most perfect development the love of infinite wisdom and unbounded power, or the love of God. Even in the imperfect life that belongs to the earth this passion exists in a considerable degree, increases even with age, outlives the perfection of the corporeal faculties, and at the moment of death is felt by the conscious being; and its future destinies depend upon the manner in which it has been exercised and exalted. When it has been misapplied and assumes the forms of vague curiosity, restless ambition, vain glory, pride or oppression, the being is degraded, it sinks in the scale of existence and still belongs to the earth or an inferior system, till its errors are corrected by painful discipline. When, on the contrary, the love of intellectual power has been exercised on its noblest objects, in discovering

and in contemplating the properties of created forms and in applying them to useful and benevolent purposes, in developing and admiring the laws of the eternal Intelligence, the destinies of the sentient principle are of a nobler kind, it rises to a higher planetary world. From the height to which you have been lifted I could carry you downwards and show you intellectual natures even inferior to those belonging to the earth, in your own moon and in the lower planets, and I could demonstrate to you the effects of pain or moral evil in assisting in the great plan of the exaltation of spiritual natures; but I will not destroy the brightness of your present idea of the scheme of the universe by degrading pictures of the effects of bad passions, and of the manner in which evil is corrected and destroyed. Your vision must end with the glorious view of the inhabitants of the cometary worlds; I cannot show you the beings of the system to which I myself belong, that of the sun; your organs would perish before our brightness, and I am only permitted to be present to you as a sound or intellectual voice. *We* are likewise in progression, but we see and know something of the plans of infinite wisdom; we feel the personal presence of that supreme Deity which you only imagine; to you belongs faith, to us knowledge; and our greatest delight results from the conviction that we are lights kindled by his light and that we belong to his substance. To obey, to love, to wonder and adore form our relations to the infinite Intelligence. We feel his laws are those of eternal justice and that they govern all things from the most glorious intellectual natures belonging to the sun and fixed stars to the meanest spark of life animating an atom crawling in the dust of your earth. We know all things begin from and end in his ever-

lasting essence, the cause of causes, the power of powers."

The low and sweet voice ceased: it appeared as if I had fallen suddenly upon the earth, but there was a bright light before me, and I heard my name loudly called; the voice was not of my intellectual guide,—the genius before me was my servant bearing a flambeau in his hand. He told me he had been searching me in vain amongst the ruins, that the carriage had been waiting for me above an hour, and that he had left a large party of my friends assembled in the Palazzo F——.

DIALOGUE THE SECOND.

DISCUSSIONS CONNECTED WITH THE VISION IN THE COLOSSEUM.

THE same friends, Ambrosio and Onuphrio, who were my companions at Rome in the winter, accompanied me in the spring to Naples. Many conversations occurred in the course of our journey, which were often to me peculiarly instructive, and from the difference of their opinions generally animated and often entertaining. I shall detail one of these conversations, which took place in the evening on the summit of Vesuvius, and the remembrance of which, from its connexion with my vision in the Colosseum, has always a peculiar interest for me. We had reached, with some labour, the edge of the crater, and were admiring the wonderful scene around us;—I shall give the conversation in the words of the persons of the drama.

PHILALETHES.—It is difficult to say whether there is more of sublimity or beauty in the scene around us.

Nature appears at once smiling and frowning, in activity and repose. How tremendous is the volcano, how magnificent this great laboratory of nature in its unceasing fire, its subterraneous lightnings and thunder, its volumes of smoke, its showers of stones and its rivers of ignited lava! How contrasted the darkness of the scorïæ, the ruins and the desolation round the crater with the scene below! There we see the rich field covered with flax, or maize, or millet, and intersected by rows of trees, which support the green and graceful festoons of the vine; the orange and lemon tree covered with golden fruit, appear in the sheltered glens; the olive-trees cover the lower hills; islands, purple in the beams of the setting sun, are scattered over the sea in the west, and the sky is tinted with red softening into the brightest and purest azure; the distant mountains still retain a part of the snows of winter, but they are rapidly melting, and they absolutely seem to melt, reflecting the beams of the setting sun, glowing as if on fire. And man appears emulous of nature, for the city below is full of activity; the nearest part of the bay is covered with boats; busy multitudes crowd the strand, and at the same time may be seen a number of the arts belonging to civilized society in operation, house-building, ship-building, rope-making, the manipulations of the smith and of the agriculturist; and not only the useful arts, but even the amusements and luxuries of a great metropolis may be witnessed from the spot in which we stand; that motley crowd is collected round a pulcinella, and those smaller groups that surround the stalls are employed in enjoying the favourite food and drink of the lazzaroni.

AMBROSIO.—We see not only the power and activity of man, as existing at present, and of which the highest example may be represented by the steam-boat, which

is now departing for Palermo, but we may likewise view scenes which carry us into the very bosom of antiquity, and, as it were, make us live with the generations of past ages. Those small square buildings, scarcely visible in the distance, are the tombs of distinguished men amongst the early Greek colonists of the country; and those two rows of houses without roofs, which appear as if newly erecting, constitute a Roman town restored from its ashes, that remained for centuries, as if it had been swept from the face of the earth. When you study it in detail, you will hardly avoid the illusion that it is a rising city; you will almost be tempted to ask where are the workmen, so perfect are the walls of the houses, so bright and uninjured the painting upon them. Hardly any thing is wanting to make this scene a magnificent epitome of all that is most worthy of admiration in nature and art; had there been in addition to the other objects a fine river and a waterfall, the epitome would, I think, have been absolutely perfect.

PHIL.—You are most unreasonable in imagining additions to a scene which it is impossible to embrace in one view, and which presents so many objects to the senses, the memory, and to the imagination; yet there is a river in the valley between Naples and Castel del Mare; you may see its silver thread and the white foam of its torrents in the distance; and if you were geologists you would find a number of sources of interest, which have not been mentioned, in the scenery surrounding us. Somma, which is before us, for instance, affords a wonderful example of a mountain formed of marine deposits, and which has been raised by subterraneous fire, and those large and singular veins which you see at the base and rising through the substance of the strata, are composed of volcanic porphyry, and offer a

most striking and beautiful example of the generation and structure of rocks and mineral formations.

ONUPHRIO.—As we passed through Portici, on the road to the base of Vesuvius, it appeared to me that I saw a stone which had an ancient Roman inscription upon it, and which occupied the place of a portal in the modern palace of the Barberini.

PHIL.—This is not an uncommon circumstance; most of the stones used in the palaces of Portici had been employed more than 2000 years before, in structures raised by the ancient Romans or Greek colonists; and it is not a little remarkable, that the buildings of Herculaneum, a town covered with ashes, tufa, and lava, from the first recorded eruption of Vesuvius more than 1700 years ago, should have been constructed of volcanic materials produced by some antecedent igneous action of the mountain in times beyond the reach of history; and it is still more remarkable that men should have gone on for so many ages making erections in spots where their works have been so often destroyed, inattentive to the voice of time or the warnings of nature.

ONU.—This last fact recalls to my recollection an idea which Philalethes started in the remarkable dream, which he would have us believe occurred to him in the Colosseum; namely, that no important facts which can be useful to society are ever lost, but that like these stones, though covered with ashes or hidden amongst ruins, they are sure to be brought forward again and made use of in some new form.

AMB.—I do not see the justness of the analogy to which Onuphrio refers; but there are many parts of that vision on which I should wish to hear the explanations of Philalethes. I consider it in fact as a sort of poetical epitome of his philosophical opinions, and I re-

gard this vision or dream as a mere web of his imagination, in which he intended to catch us his summer-flies and travelling companions.

PHIL.—There, Ambrosio, you do me wrong. I will acknowledge, if you please, that the vision in the Colosseum is a fiction; but the most important parts of it really occurred to me in sleep, particularly that in which I seemed to leave the earth and launch into the infinity of space under the guidance of a tutelary genius. And the origin and progress of civil society form likewise parts of another dream which I had many years ago, and it was in the reverie which happened when you quitted me in the Colosseum that I wove all these thoughts together, and gave them the form in which I narrated them to you.

AMB.—Of course we may consider them as an accurate representation of your waking thoughts.

PHIL.—I do not say that they strictly are so; for I am not quite convinced that dreams are always representations of the state of the mind modified by organic diseases or by associations. There are certainly no absolutely new ideas produced in sleep, yet I have had more than one instance, in the course of my life, of most extraordinary combinations occurring in this state, which have had considerable influence on my feelings, my imagination, and my health.

ONU.—Why, Philalethes, you are becoming a visionary, a dreamer of dreams; we shall perhaps set you down by the side of Jacob Behmen or of Emanuel Swedenbourg, and in an earlier age you might have been a prophet and have ranked perhaps with Mahomet. But pray give us one of these instances in which such a marvellous influence was produced on your imagination and your health by a dream, that we may form some

judgment of the nature of your second sight or inspirations, and whether they have any foundation, or whether they are not, as I believe, really unfounded, inventions of the fancy, dreams respecting dreams.

PHIL.—I anticipate unbelief, and I expose myself to your ridicule in the statement I am about to make, yet I shall mention nothing but a simple fact. Almost a quarter of a century ago, as you know, I contracted that terrible form of typhus fever known by the name of jail fever, I may say, not from any imprudence of my own, but whilst engaged in putting in execution a plan for ventilating one of the great prisons of the metropolis. My illness was severe and dangerous; as long as the fever continued, my dreams or deliriums were most painful and oppressive; but when the weakness consequent to exhaustion came on, and when the probability of death seemed to my physicians greater than that of life, there was an entire change in all my ideal combinations. I remained in an apparently senseless or lethargic state, but in fact my mind was peculiarly active; there was always before me the form of a beautiful woman with whom I was engaged in the most interesting and intellectual conversation.

AMB.—The figure of a lady with whom you were in love.

PHIL.—No such thing; I was passionately in love at the time, but the object of my admiration was a lady with black hair, dark eyes and pale complexion; this spirit of my vision on the contrary had brown hair, blue eyes, and a bright rosy complexion, and was, as far as I can recollect, unlike any of the amatory forms which in early youth had so often haunted my imagination. Her figure for many days was so distinct in my mind as to form almost a visual image: as I gained strength the

visits of my good angel, for so I called it, became less frequent, and when I was restored to health they were altogether discontinued.

ONU.—I see nothing very strange in this, a mere reaction of the mind after severe pain, and, to a young man of twenty-five, there are few more pleasurable images than that of a beautiful maiden with blue eyes, blooming cheeks and long nut-brown hair.

PHIL.—But all my feelings and all my conversations with this visionary maiden were of an intellectual and refined nature.

ONU.—Yes, I suppose, as long as you were ill.

PHIL.—I will not allow you to treat me with ridicule on this point till you have heard the second part of my tale. Ten years after I had recovered from the fever, and when I had almost lost the recollection of the vision, it was recalled to my memory by a very blooming and graceful maiden fourteen or fifteen years old, that I accidentally met during my travels in Illyria; but I cannot say that the impression made upon my mind by this female was very strong. Now comes the extraordinary part of the narrative; ten years after, twenty years after my first illness, at a time when I was exceedingly weak from a severe and dangerous malady, which for many weeks threatened my life, and when my mind was almost in a desponding state, being in a course of travels ordered by my medical advisers, I again met the person who was the representative of my visionary female; and to her kindness and care I believe I owe what remains to me of existence. My despondency gradually disappeared, and though my health still continued weak, life began to possess charms for me which I had thought were for ever gone; and I could not help identifying the living angel with the vision which ap-

peared as my guardian genius during the illness of my youth.

ONU.—I really see nothing at all in this fact, whether the first or the second part of the narrative be considered, beyond the influence of an imagination excited by disease. From youth, even to age, women are our guardian angels, our comforters; and I dare say any other handsome young female, who had been your nurse in your last illness, would have coincided with your remembrance of the vision, even though her eyes had been hazel and her hair flaxen. Nothing can be more loose than the images represented in dreams following a fever, and with the nervous susceptibility produced by your last illness, almost any agreeable form would have become the representative of your imaginary guardian genius. Thus it is, that by the power of fancy, material forms are clothed in supernatural attributes, and in the same manner imaginary divinities have all the forms of mortality bestowed upon them. The gods of the pagan mythology were in all their characters and attributes exalted human beings; the demon of the coward, and the angelic form that appears in the dreams of some maid smitten by devotion, and who, having lost her earthly lover, fixes her thoughts on heaven, are clothed in the character and vestments of humanity changed by the dreaminess of passion.

AMB.—With such a tendency, Philalethes, as you have shown to believe in something like a supernatural or divine influence on the human mind, I am astonished there should be so much scepticism belonging to your vision in the Colosseum. And your view of the early state of man, after his first creation, is not only incompatible with revelation, but likewise with reason and

every thing that we know respecting the history or traditions of the early nations of antiquity.

PHIL.—Be more distinct and detailed in your statements, Ambrosio, that I may be able to reply to them ; and whilst we are waiting for the sunrise we may discuss the subject, and for this, let us seat ourselves on these stones where we shall be warmed by the vicinity of the current of lava.

AMB.—You consider man, in his early or first created state, a savage like those who now inhabit New Holland or New Zealand, acquiring by the little use that they make of a feeble reason the power of supporting and extending life. Now, I contend, that if man had been so created, he must inevitably have been destroyed by the elements or devoured by savage beasts, so infinitely his superiors in physical force ; he must therefore have been formed with various instinctive faculties and propensities, with a perfection of form and use of organs fitting him to become the master of the earth ; and, it appears to me, that the account given in Genesis of the first parents of mankind having been placed in a garden fitted with every thing necessary to their existence and enjoyment, and ordered to increase and multiply there, is strictly in harmony with reason and accordant with all just metaphysical views of the human mind. Man as he now exists can only be raised with great care and difficulty from the infant to the mature state ; all his motions are at first automatic and become voluntary by association ; he has to learn every thing by slow and difficult processes, many months elapse before he is able to stand, and many years before he is able to provide for the common wants of life. Without the mother or the nurse in his infant state, he would die in a few hours, and without the laborious discipline of instruction and

example he would remain idiotic and inferior to most other animals. His reason is only acquired gradually, and when in its highest perfection is often uncertain in its results; he must therefore have been created with instincts that for a long while supplied the want of reason and which enabled him from the first moment of his existence to provide for his wants, to gratify his desires and enjoy the power and the activity of life.

PHIL.—I acknowledge that your objection has some weight, but not so much as you would attribute to it. I will suppose that the first created man or men had certain powers or instincts, such as now belong to the rudest savages of the southern hemisphere; I will suppose them created with the use of their organs for defence and offence, and with passions and propensities enabling them to supply their own wants. And I oppose the fact of races who are now actually in this state to your vague historical or traditionary records; and their gradual progress or improvement from this early state of society to that of the highest state of civilization or refinement may, I think, be easily deduced from the exertions of reason assisted by the influence of the moral powers and of physical circumstances. Accident, I conceive, must have had some influence in laying the foundations of certain arts; and a climate in which labour was not too oppressive, and in which the exertion of industry was required to provide for the wants of life, must have fixed the character of the activity of the early improving people. Where nature is too kind a mother, man is generally a spoiled child; where she is severe and a step-mother, his powers are usually withered and destroyed. The people of the south and the north, and those be-

tween the tropics, offer, even at this day, proof of the truth of this principle; and it is even possible now to find on the surface of the earth, all the different gradations of the states of society, from that in which man is scarcely removed above the brute, to that in which he appears approaching in his nature to a divine intelligence. Besides, reason being the noblest gift of God to man, I can hardly suppose that an infinitely powerful and all-wise Creator would bestow upon the early inhabitants of the globe a greater proportion of instinct than was at first necessary to preserve their existence, and that he would not leave the great progress of their improvement to the development and exaltation of their reasoning powers.

AMB.—You appear to me in your argument to have forgotten the influence that any civilized race must possess over savages; and many of the nations which you consider as in their original state, may have descended from nations formerly civilized; and it is quite as easy to trace the retrograde steps of a people as their advances. The savage hordes who now inhabit the northern coast of Africa are probably descended from the opulent, commercial and ingenious Carthaginians who once contended with Rome for the Empire of the world; and even nearer home, we might find in southern Italy and her islands, proofs of a degradation not much inferior. What I contend for is, the civilization of the first patriarchal races who peopled the East, and passed into Europe from Armenia, in which, paradise is supposed to have been placed. The early civilization of this race could only have been in consequence of their powers and instincts having been of a higher character than those of savages. They appear to have been small families,—a state not at all fitted for the discovery of arts by

the exercise of the mind, and they professed the most sublime form of religion,—the worship of one Supreme Intelligence, a truth which after a thousand years of civilization, was with difficulty attained by the most powerful efforts of reasoning by the Greek sages. It appears to me, that in the history of the Jews, nothing can be more in conformity to our ideas of just analogy, than this series of events. Our first parents were created with everything necessary for their wants and their happiness; they had only one duty to perform, by their obedience to prove their love and devotion to their Creator. In this they failed, and death or the fear of death became a curse upon their race; but the father of mankind repented, and his instinctive or intellectual powers given by revelation were transmitted to his offspring more or less modified by their reason, which they had gained as the fruit of their disobedience. One branch of his offspring, however, in whom faith shone forth above reason, retained their peculiar powers and institutions and preserved the worship of Jehovah pure, whilst many of the races sprung from their brethren became idolatrous, and the clear light of heaven was lost through the mist of the senses; and that Being, worshipped by the Israelites only as a mysterious word, was forgotten by many of the nations who lived in the neighbouring countries, and men, beasts, the parts of the visible universe and even stocks and stones were set up as objects of adoration. The difficulty which the divine legislators of the Jewish people had to preserve the purity of their religion amongst the idolatrous nations by whom they were surrounded, proves the natural evil tendency of the human mind after the fall of man. And, whoever will consider the nature of the Mosaical or ceremonial law, and the manner in which it was sus-

pended before the end of the Roman empire, the expiatory sacrifice of the Messiah, the fear of death destroyed by the blessed hopes of immortality established by the resurrection of Jesus Christ, the destruction of Jerusalem by Titus, and the triumphs of Christianity over paganism in the time of Constantine, can I think hardly fail to acknowledge the reasonableness of the truth of revealed religion as founded upon the early history of man: and whoever acknowledges this reasonableness and this truth, must I think be dissatisfied with the view which Philalethes or his Genius has given of the progress of society, and will find in it, one instance, amongst many others that might be discovered, of the vague and erring results of his so much boasted human reason.

ONU.—I fear I shall shock Ambrosio, but I cannot help vindicating a little the philosophical results of human reason, which it must be allowed are entirely hostile to his ideas. I agree with Philalethes, that it is the noblest gift of God to man; and I cannot think that Ambrosio's view of the paradisaical condition and the fall of man and the progress of society, is at all in conformity with the ideas we ought to form of the institutions of an infinitely wise and powerful being. Besides, Ambrosio speaks of the reasonableness of his own opinions: of course his notions of reason must be different from mine, or we have adopted different forms of logic. I do not find in the biblical history any idea of the Supreme Intelligence conformable to those of the Greek philosophers; on the contrary, I find Jehovah every where described as a powerful material being, endowed with organs, feelings, and passions, similar to those of a great and exalted human agent. He is described as making man in his own image, as

walking in the garden in the cool of the evening, as being pleased with sacrificial offerings, as angry with Adam and Eve, as personally cursing Cain for his crime of fratricide, and even as providing our first parents with garments to hide their nakedness; then, he appears a material form in the midst of flames, thunder and lightning, and was regarded by the Levites as having a fixed residence in the ark. He is contrasted, throughout the whole of the Old Testament, with the gods of the heathens only as being more powerful, and in the strange scene which took place in Pharaoh's court he seemed to have measured his abilities with those of certain seers or magicians, and to have proved his superiority only by producing greater and more tremendous plagues. In all the early history of the Jewish nation, there is no conception approaching to the sublimity of that of Anaxagoras, who called God the Intelligence or *νοῦς*; he appears always, on the contrary, like the genii of Arabian romance, living in clouds, descending on mountains, urging his chosen people to commit the most atrocious crimes, to destroy all the races not professing the same worship, and to exterminate even the child and the unborn infant. Then, I find in the Old Testament no promise of a spiritual Messiah, but only of a temporal king, who, as the Jews believe, is yet to come. The serpent in Genesis has no connexion with the spirit of evil, but is described only as the most subtle beast of the field, and having injured man, there was to be a perpetual enmity between their races, the serpent when able was to bite the heel of the man, and the man, when an opportunity occurred, was to bruise the head of the serpent. I will allow, if you please, that an instinct of religion or superstition belongs to the human mind, and that the different forms which

this instinct assumes depend upon various circumstances and accidents of history and climate; but, I am not sure that the religion of the Jews was superior to that of the Sabæans who worshipped the stars, or the ancient Persians who adored the sun as the visible symbol of divine power, or the eastern nations who in the various forms of the visible universe worshipped the powers and energies of the Divinity. I feel like the ancient Romans with respect to toleration; I would give a place to all the gods in my Pantheon, but I would not allow the followers of Bramah or of Christ to quarrel about the modes of incarnation or the superiority of the attributes of their triune God.

AMB.—You have mistaken me, Onuphrio, if you think I am shocked by your opinions; I have seen too much of the wanderings of human reason, ever to be surprised by them, and the views you have adopted are not uncommon amongst young men of very superior talents, who have only slightly examined the evidences of revealed religion. But I am glad to find that you have not adopted the code of infidelity of many of the French revolutionists and of an English school of sceptics, who find in the ancient astronomy all the germs of the worship of the Hebrews, who identify the labours of Hercules with those of the Jewish heroes, and who find the life, death and resurrection of the Messiah in the history of the solar day. You at least allow the existence of a peculiar religious instinct, or, as you are pleased to call it, superstition, belonging to the human mind, and I have hopes that upon this foundation you will ultimately build up a system of faith not unworthy a philosopher and a christian. Man, with whatever religious instincts he was created, was intended to communicate with the visible universe by sensations and

act upon it by his organs, and in the earliest state of society he was more particularly influenced by his gross senses. Allowing the existence of a Supreme Intelligence and his beneficent intentions towards man, the ideas of his presence which he might think fit to impress upon the mind, either for the purpose of veneration, or of love, of hope or fear, must have been in harmony with the general train of his sensations: I am not sure that I make myself intelligible. The same infinite power which in an instant could create an universe, could of course so modify the ideas of an intellectual being as to give them that form and character most fitted for his existence; and, I suppose in the early state of created man, he imagined that he enjoyed the actual presence of the Divinity and heard his voice; I take this to be the first and simplest result of religious instinct. In early times amongst the patriarchs I suppose these ideas were so vivid as to be confounded with impressions; but as religious instinct probably became feebler in their posterity, the vividness of the impressions diminished, and they then became visions or dreams, which with the prophets seem to have constituted inspiration. I do not suppose that the Supreme Being ever made himself known to man, by a real change in the order of nature, but that the sensations of men were so modified by their instincts, as to induce the belief in his presence. That there was a divine intelligence continually acting upon the race of Seth, as his chosen people, is, I think, clearly proved by the events of their history, and also that the early opinions of a small tribe in Judæa, were designed for the foundation of the religion of the most active and civilized and powerful nations of the world, and that after a lapse of three thousand years. The manner in which Chris-

tianity spread over the world, with a few obscure mechanics or fishermen for its promulgators, the mode in which it triumphed over Paganism, even when professed and supported by the power and philosophy of a Julian, the martyrs who subscribed to the truth of Christianity, by shedding their blood for the faith, the exalted nature of those intellectual men by whom it has been professed, who had examined all the depths of nature, and exercised the profoundest faculties of thought, such as Newton, Locke, and Hartley, all appear to me strong arguments in favour of revealed religion. I prefer rather founding my creed upon the fitness of its doctrines, than upon historical evidences, or the nature of its miracles. The Divine Intelligence chooses that men should be convinced, according to the ordinary train of their sensations, and on all occasions it appears to me more natural, that a change should take place in the human mind, than in the order of nature. The popular opinion of the people of Judæa was, that certain diseases were occasioned by devils taking possession of a human being; the disease was cured by our Saviour,—and this, in the Gospel, is expressed by his casting out devils. But without entering into explanations respecting the historical miracles belonging to Christianity—it is sufficient to say that its truth is attested by a constantly-existing miracle—the present state of the Jews, which was predicted by Jesus; their temple and city were destroyed, and all attempts made to rebuild it, have been vain; and they remain the despised and outcasts of the world.

ONU.—But you have not answered my objections with respect to the cruelties exercised by the Jews under the command of Jehovah, which appear to me in opposition to all our views of divine justice.

AMB.—I think even Philalethes will allow that physical and moral diseases are hereditary,—and that to destroy a pernicious unbelief or demoniacal worship, it was necessary to destroy the whole race, root and branch. As an example, I will imagine a certain contagious disease, which is transmitted by parents to children, and which, like the plague, is communicated to sound persons by contact; to destroy a family of men who would spread this disease over the whole earth, would unquestionably be a mercy. Besides, I believe in the immortality of the sentient principle in man; destruction of life, is only a change of existence; and supposing the new existence a superior one, it is a gain. To the Supreme Intelligence, the death of a million of human beings, is the mere circumstance of so many spiritual essences changing their habitations, and is analogous to the myriad millions of larvæ that leave their coats and shells behind them, and rise into the atmosphere, as flies in a summer day. When man measures the works of the divine mind by his own feeble combinations, he must wander in gross error; the infinite can never be understood by the finite.

ONU.—As far as I can comprehend your reasoning, the priests of Juggernaut might make the same defence for their idol, and find in such views a fair apology for the destruction of thousands of voluntary victims, crushed to pieces by the feet of the sacred elephant.

AMB.—Undoubtedly they might; and I should allow the justness of their defence, if I saw in their religion any germs of a divine institution fitted to become, like the religion of Jehovah, the faith of the whole civilized world, embracing the most perfect form of theism, and the most refined and exalted morality. I consider the early acts of the Jewish nation, as the lowest and rudest

steps of a temple raised by the Supreme Being to contain the altar of sacrifice to his glory. In the early periods of society, rude and uncultivated men could only be acted upon by gross and temporal rewards and punishments; severe rites and heavy discipline were required to keep the mind in order—and the punishment of the idolatrous nations, served as an example for the Jews. When Christianity took the place of Judaism, the ideas of the Supreme Being became more pure and abstracted, and the visible attributes of Jehovah and his angels appear to have been less frequently presented to the mind; yet even for many ages, it seemed as if the grossness of our material senses required some assistance from the eye, in fixing or perpetuating the character of religious instinct: and the church to which I belong, and I may say the whole Christian Church in early times, allowed visible images, pictures, statues, and relics as the means of awakening the stronger devotional feelings. We have been accused of worshipping merely inanimate objects; but this is a very false notion of the nature of our faith; we regard them merely as vivid characters, representing spiritual existences,—and we no more worship them, than the Protestant does his Bible, when he kisses it under a solemn religious adjuration. The past, the present, and the future, being the same to the infinite and divine Intelligence, and man being created in love for the purposes of happiness, the moral and religious discipline to which he was submitted, was in strict conformity to his progressive faculties, and to the primary laws of his nature. It is but a rude analogy, yet it is the only one I can find, that of comparing the Supreme Being to a wise and good father, who, to secure the well-being of his offspring, is obliged to adopt a system of rewards and

punishments, in which the senses at first, and afterwards the imagination and reason, are concerned. He terrifies them by the example of others, awakens their love of glory, by pointing out the distinction and the happiness gained by superior men, by adopting a particular line of conduct; he uses at first the rod, and gradually substitutes for it the fear of immediate shame: and having awakened the fear of shame, and the love of praise or honour with respect to temporary and immediate actions, he extends them to the conduct of the whole of life, and makes what was a momentary feeling, a permanent and immutable principle. And obedience in the child to the will of such a parent, may be compared to faith in, and obedience to the will of the Supreme Being; and a wayward and disobedient child, who reasons upon and doubts the utility of the discipline of such a father, is much in the same state in which the adult man is, who doubts if there be good in the decrees of Providence, and who questions the harmony of the plan of the moral universe.

ONU.—Allowing the perfection of your moral scheme of religion and its fitness for the nature of man, I find it impossible to believe the primary doctrines on which this scheme is founded. You make the divine mind, the creator of infinite worlds, enter into the form of a man born of a virgin; you make the eternal and immortal God, the victim of shameful punishment, and suffering death on the cross, recovering his life after three days, and carrying his maimed and lacerated body into the heaven of heavens.

AMB.—You, like all other sceptics, make your own interpretations of the Scriptures and set up a standard for divine power in human reason. The infinite and eternal mind, as I said before, fits the doctrines of

religion to the minds by which they are to be embraced. I see no improbability in the idea that an integrant part of his essence may have animated a human form; there can be no doubt that this belief has existed in the human mind, and the belief constitutes the vital part of the religion. We know nothing of the generation of the human being in the ordinary course of nature; how absurd then to attempt to reason upon the acts of the divine mind! nor is there more difficulty in imagining the event of a divine conception than of a divine creation. To God the infinite, little and great, as measured by human powers, are equal; a creature of this earth, however humble and insignificant, may have the same weight with millions of superior beings inhabiting higher systems. But I consider all the miraculous parts of our religion as affected by changes in the sensations or ideas of the human mind and not by physical changes in the order of nature; a man who has to repair a piece of machinery, as a clock, must take it to pieces and in fact remake it, but to infinite wisdom and power a change in the intellectual state of the human being may be the result of a momentary will, and the mere act of faith may produce the change. How great the powers of imagination are, even in ordinary life, is shown by many striking facts, and nothing seems impossible to this imagination when acted upon by divine influence. To attempt to answer all the objections which may be derived from the want of conformity in the doctrines of Christianity to the usual order of events would be an interminable labour. My first principle is, that religion has nothing to do with the common order of events; it is a pure and divine instinct intended to give results to man which he cannot obtain by the common use of his reason, and which at first view often

appear contradictory to it, but which when examined by the most refined tests, and considered in the most extensive and profound relations are in fact in conformity with the most exalted intellectual knowledge, so that indeed the results of pure reason ultimately become the same with those of faith,—the tree of knowledge is grafted upon the tree of life, and that fruit which brought the fear of death into the world budding on an immortal stock becomes the fruit of the promise of immortality.

ONU.—You derive Christianity from Judaism; I cannot see their connexion, and it appears to me that the religion of Mahomet is more naturally a scion from the stock of Moses. Christ was a Jew and was circumcised; this rite was continued by Mahomet, and is to this day adopted by his disciples, though rejected by the Christians; and the doctrines of Mahomet appear to me to have a higher claim to divine origin than those of Jesus; his morality is as pure, his theism purer, and his system of rewards and punishments after death as much in conformity with our ideas of eternal justice.

AMB.—I will willingly make the decision of the general question dependent upon the decision of this particular one. No attempts have been made by the Mahometans to find any predictions respecting their founder in the Old Testament, and they have never pretended even that he was the Messiah: therefore as far as prophecy is concerned there is no ground for admitting the truth of the religion of Mahomet. It has been the fashion with a particular sect of infidels to praise the morality of the Mahometans, but I think unjustly. They are said to be honest in their dealings and charitable to those of their own persuasion; but they allow polygamy and a plurality of women, and are

despisers and persecutors of the nations professing a different faith : and what a contrast does this morality present to that of the Gospel which inculcates charity to all mankind, and orders benevolent actions to be performed even to enemies ; and the purity and simplicity of the infant is held up by Christ as the model of imitation for his followers. Then, in the rewards and punishments of the future state of the Mahometans, how gross are all the ideas, how unlike the promises of a divine and spiritual being ; their paradise is a mere earthly garden of sensual pleasure, and their Houris represent the ladies of their own harems rather than glorified angelic natures. How different is the Christian heaven, how sublime in its idea, indefinite, yet well suited to a being of intellectual and progressive faculties ; “ Eye hath not seen, nor ear heard, nor hath it entered into the heart of man to conceive the joys that He hath prepared for those who love Him.”

ONU.—I confess your answer to my last argument is a triumphant one ; but I cannot allow a question of such extent and of such a variety of bearings to be decided by so slight an advantage as that which you have gained by this answer. I will now offer another difficulty to you. The law of the Jews, you will allow, was established by God himself and delivered to Moses from the seat of his glory amongst storms, thunder and lightnings on Mount Sinai ; why should this law, if pure and divine, have been overturned by the same Being who established it ? And all the ceremonies of the Hebrews have been abolished by the first Christians.

AMB.—I deny that the divine law of Moses was abolished by Christ, who himself says “ I came to confirm the law, not to destroy it.” And, the Ten Commandments form the vital parts of the foundation of the

creed of the true Christian. It appears that the religion of Christ was the same pure theism with that of the patriarchs; and the rites and ceremonies established by Moses seem to have been only adjuncts to the spiritual religion intended to suit a particular climate and a particular state of the Jewish nation, rather a dress or clothing of the religion than forming a constituent part of it, a system of discipline of life and manners rather than an essential part of doctrine. The rites of circumcision and ablution were necessary to the health and perhaps even to the existence of a people living on the hottest part of the shores of the Mediterranean. And, in the sacrifices made of the first-fruits and of the chosen of the flock, we may see a design not merely connected with the religious faith of the people, but even with their political economy. To offer their choicest and best property as a proof of their gratitude to the Supreme Being was a kind of test of devotedness and obedience to the theocracy; and these sacrifices, by obliging them to raise more produce and provide more cattle than were essential to their ordinary support, preserved them from the danger of famine, as in case of a dearth it was easy for the priests under the divine permission to apply these offerings to the necessities of the people. All the pure parts of the faith which had descended from Abraham to David were preserved by Jesus Christ; but the ceremonial religion was fitted only for a particular nation and a particular country; Christianity on the contrary was to be the religion of the world and of a civilized and improving world. And it appears to me to be an additional proof of its divine nature and origin, that it is exactly in conformity to the principles of the improvement and perfection of the human mind. When given to a particular race fixed in

a peculiar climate, its objects were sensible, its discipline was severe, and its rites and ceremonies numerous and imposing, fitted to act upon weak, ignorant and consequently obstinate men. In its gradual development it threw off its local character and its particular forms, and adopted ceremonies more fitted for mankind in general; and in its ultimate views, it preserves only pure, spiritual, and I may say philosophical doctrines, the unity of the divine nature and a future state, embracing a system of rewards and punishments suited to an accountable and immortal being.

PHIL.—I have been attentively listening to your discussion. The views which Ambrosio has taken of Christianity certainly throw a light over it perfectly new to me; and, I must say in candour, that I am disposed to adopt his notion of the early state of society rather than that of my Genius. I have always been accustomed to consider religious feeling as instinctive; but Ambrosio's arguments have given me something approaching to a definite faith for an obscure and indefinite notion. I am willing to allow that man was created, not a savage, as he is represented in my vision, but perfect in his faculties, and with a variety of instinctive powers and knowledge; that he transmitted these powers and knowledge to his offspring; but that by an improper use of reason in disobedience to the divine will, the instinctive faculties of most of his descendants became deteriorated, and at last lost, but that these faculties were preserved in the race of Abraham and David, and the full power again bestowed upon or recovered by Christ. I am ready to allow the importance of religion in cultivating and improving the world; Ambrosio's view appears to me capable of being referred to a general law of our nature; revelation may be regarded not as a

partial interference but as a constant principle belonging to the mind of man, and the belief in supernatural forms and agency, the results of prophecies and the miracles, as one only of the necessary consequences of it. Man, as a reasoning animal, must always have doubted of his immortality and plan of conduct; in all the results of faith, there is immediate submission to a divine will, which we are sure is good. We may compare the destiny of man in this respect to that of a migratory bird; if a slow flying bird, as a landrail in the Orkneys in autumn, had reason and could use it as to the probability of his finding his way over deserts, across seas, and of securing his food in passing to a warm climate 3000 miles off, he would undoubtedly starve in Europe; under the direction of his instinct he securely arrives there in good condition. I have allowed the force of your objections to that part of my vision relating to the origin of society, but I hope you will admit that the conclusion of it is not inconsistent with the ideas derived from revelation respecting the future state of the human being.

AMB.—Revelation has not disclosed to us the nature of this state, but only fixed its certainty. We are sure from geological facts, as well as from sacred history, that man is a recent animal on the globe, and that this globe has undergone one considerable revolution, since the creation, by water; and we are taught that it is to undergo another, by fire, preparatory to a new and glorified state of existence of man; but this is all we are permitted to know; and as this state is to be entirely different from the present one of misery and probation, any knowledge respecting it would be useless, and indeed almost impossible.

PHIL.—My Genius has placed the more exalted spi-

ritual natures in cometary worlds, and this last fiery revolution may be produced by the appulse of a comet.

AMB.—Human fancy may imagine a thousand manners in which it may be produced, but upon such notions it is absurd to dwell. I will not allow your Genius the slightest approach to inspiration, and I can admit no verisimilitude in a reverie which is fixed on a foundation you now allow to be so weak. But see, the twilight is beginning to appear in the orient sky, and there are some dark clouds on the horizon opposite to the crater of Vesuvius, the lower edges of which transmit a bright light, showing the sun is already risen in the country beneath them. I would say, that they may serve as an image of the hopes of immortality derived from revelation; for we are sure, from the light reflected in those clouds, that the lands below us are in the brightest sunshine, but we are entirely ignorant of the surface and the scenery; so, by revelation, the light of an imperishable and glorious world is disclosed to us; but it is in eternity, and its objects cannot be seen by mortal eye or imaged by mortal imagination.

PHIL.—I am not so well read in the scriptures as I hope I shall be at no very distant period of time; but, I believe the pleasures of heaven are mentioned more distinctly than you allow in the sacred writings. I think, I remember that the saints are said to be crowned with palms and amaranths, and that they are described as perpetually hymning and praising God.

AMB.—This is evidently only metaphorical; music is the sensual pleasure which approaches nearest to an intellectual one, and probably may represent the delight resulting from the perception of the harmony of things and of truth seen in God. The palm as an evergreen tree, and the amaranth a perdurable flower, are emblems

of immortality. If I am allowed to give a metaphorical allusion to the future state of the blest, I should image it by the orange grove in that sheltered glen, on which the sun is now beginning to shine, and of which the trees are at the same time loaded with sweet golden fruit and balmy silver flowers. Such objects may well portray a state in which hope and fruition become one eternal feeling.

ONU.—This glorious sunrise seems to have made you both poetical. Though with the darkest and most gloomy mind of the party, I cannot help feeling its influence, I cannot help believing with you, that the night of death will be succeeded by a bright morning; but as in the scene below us, the objects are nearly the same as they were last evening, with more of brightness and brilliancy, with a fairer prospect in the east and more mist in the west, so I cannot help believing that our new state of existence must bear an analogy to the present one, and that the order of events will not be entirely different.

AMB.—Your view is not an unnatural one; but I am rejoiced to find some symptoms of a change in your opinions.

ONU.—I wish with all my heart they were stronger; I begin to feel my reason a weight, and my scepticism a very heavy load. Your discussions have made me a philo-christian, but I cannot understand nor embrace all the views you have developed, though I really wish to do so.

AMB.—Your wish if sincere, I doubt not will be gratified. Fix your powerful mind upon the harmony of the moral world, as you have been long accustomed to do upon the order of the physical universe, and you will see the scheme of the eternal Intelligence developing

itself alike in both. Think of the goodness and mercy of Omnipotence, and aid your contemplation by devotional feelings and mental prayer and aspirations to the source of all knowledge, and wait with humility for the light which I doubt not will be so produced in your mind.

ONU.—You again perplex me; I cannot believe that the adorations or offerings of so feeble a creature can influence the decrees of Omnipotence.

AMB.—You mistake me: as to their influence or affecting the supreme mind, it is out of the question; but they affect your own mind, they perpetuate a habit of gratitude and of obedience which may gradually end in perfect faith; they discipline the affections, and keep the heart in a state of preparation to receive and preserve all good and pious feelings. Whoever passes from utter darkness into bright sunshine, finds that he cannot at first distinguish objects better in one than in the other; but in a feeble light, he acquires gradually the power of bearing a brighter one, and gains at last the habit not only of supporting it, but of receiving delight as well as instruction from it. In the pious contemplations that I recommend to you, there is the twilight or sober dawn of faith which will ultimately enable you to support the brightness of its meridian sun.

ONU.—I understand you; but your metaphor is more poetical than just; *your* discipline, however, I have no doubt, is better fitted to enable me to bear the light, than to contemplate it through the smoked or coloured glasses of scepticism.

AMB.—Yes, for they not only diminish its brightness, but alter its nature.

DIALOGUE THE THIRD.

THE UNKNOWN.

THE same persons accompanied me in many journeys by land and water to different parts of the Phlegræan fields, and we enjoyed in a most delightful season, the beginning of May, the beauties of the glorious country which encloses the Bay of Naples, so rich, so ornamented with the gifts of nature, so interesting from the monuments it contains, and the recollections it awakens. One excursion, the last we made in southern Italy, the most important both from the extraordinary personage with whom it made me acquainted and his influence upon my future life, merits a particular detail which I shall now deliver to paper.

It was on the 16th of May 18— that we left Naples at three in the morning for the purpose of visiting the remains of the temples of Pæstum, and having provided relays of horses we found ourselves at about half-past one o'clock descending the hill of Eboli towards the plain which contains these stupendous monuments of antiquity. Were my existence to be prolonged through ten centuries, I think I could never forget the pleasure I received on that delicious spot. We alighted from our carriage to take some refreshment, and we reposed upon the herbage under the shade of a magnificent pine contemplating the view around and below us. On the right were the green hills covered with trees stretching towards Salerno; beyond them were the marble cliffs which form the southern extremity of the Bay

of Sorento ; immediately below our feet was a rich and cultivated country filled with vineyards and abounding in villas, in the gardens of which were seen the olive and the cypress tree connected as if to memorialize how near to each other are life and death, joy and sorrow ; the distant mountains stretching beyond the plain of Pæstum were in the full luxuriance of vernal vegetation ; and in the extreme distance, as if in the midst of a desert, we saw the white temples glittering in the sunshine. The blue Tyrrhene sea filled up the outline of this scene, which though so beautiful, was not calm ; there was a heavy breeze which blew full from the southwest, it was literally a zephyr, and its freshness and strength in the middle of the day were peculiarly balmy and delightful, it seemed a breath stolen by the spring from the summer. I never saw a deeper brighter azure than that of the waves which rolled towards the shore, and which was rendered more striking by the pure whiteness of their foam. The agitation of nature seemed to be one of breathing and awakening life ; the noise made by the waving of the branches of the pine above our heads and by the rattling of its cones was overpowered by the music of a multitude of birds which sung every where in the trees that surrounded us, and the cooing of the turtle doves was heard even more distinctly than the murmuring of the waves or the whistling of the winds, so that in the strife of nature the voice of love was predominant. With our hearts touched by this extraordinary scene we descended to the ruins, and having taken at a farm-house a person who acted as guide or cicerone, we began to examine those wonderful remains which have outlived even the name of the people by whom they were raised, and which continue almost perfect, whilst a Roman and a

Saracen city since raised have been destroyed. We had been walking for half an hour round the temples in the sunshine when our guide represented to us the danger that there was of suffering from the effects of malaria, for which, as is well known, this place is notorious, and advised us to retire into the interior of the temple of Neptune. We followed his advice, and my companions began to employ themselves in measuring the circumference of one of the Doric columns, when they suddenly called my attention to a stranger who was sitting on a camp stool behind it. The appearance of any person in this place at this time was sufficiently remarkable, but the man who was before us from his dress and appearance would have been remarkable any where. He was employed in writing in a memorandum book when we first saw him, but he immediately rose and saluted us by bending the head slightly though gracefully; and this enabled me to see distinctly his person and dress. He was rather above the middle stature, slender, but with well-turned limbs; his countenance was remarkably intelligent, his eye hazel but full and strong, his front was smooth and unwrinkled, and but for some grey hairs, which appeared silvering his brown and curly locks, he might have been supposed to have hardly reached the middle age; his nose was aquiline, the expression of the lower part of his countenance remarkably sweet, and when he spoke to our guide, which he did with uncommon fluency in the Neapolitan dialect, I thought I had never heard a more agreeable voice, sonorous yet gentle and silver-sounded. His dress was very peculiar, almost like that of an ecclesiastic, but coarse and light; and there was a large soiled white hat on the ground beside him, on which was fastened a pilgrim's cockle shell, and there was suspended

round his neck a long antique blue enamelled phial, like those found in the Greek tombs, and it was attached to a rosary of coarse beads. He took up his hat and appeared to be retiring to another part of the building, when I apologized for the interruption we had given to his studies, begged him to resume them, and assured him that our stay in the building would be only momentary, for I saw that there was a cloud over the sun, the brightness of which was the cause of our retiring. I spoke in Italian; he replied in English, observing that he supposed the fear of contracting the malaria fever had induced us to seek the shelter of the shade,—“but it is too early in the season to have much reasonable fear of this insidious enemy; yet,” he added, “this bottle which you may have observed here at my breast, I carry about with me, as a supposed preventative of the effects of malaria, and as far as my experience, a very limited one however, has gone, it is effectual.” I ventured to ask him what the bottle might contain, as such a benefit ought to be made known to the world. He replied;—“It is a mixture which slowly produces the substance called by chemists chlorine, which is well known to be generally destructive to contagious matters; and a friend of mine who has lived for many years in Italy, and who has made a number of experiments with it, by exposing himself to the danger of fever in the worst seasons and in the worst places, believes that it is a secure preventative. I am not convinced of this; but it can do no harm; and in waiting for more evidence of its utility, I employ it without putting the least confidence in its power; nor do I expose myself to the same danger, as my friend has done, for the sake of an experiment.”—I said, “I believe several scientific persons, Brocchi amongst others, have doubted the existence of

any specific matter in the atmosphere, producing intermittent fevers, in marshy countries and hot climates; and have been more disposed to attribute the disease to physical causes, dependent upon the great differences of temperature between day and night, and to the refrigerating effects of the dense fogs, common in such situations, in the evening and morning; and, on this hypothesis, they have recommended warm woollen clothing and fires at night, as the best preventatives against these destructive diseases, so fatal to the peasants who remain in the summer and autumn in the neighbourhood of the maremme of Rome, Tuscany or Naples." The stranger said, "I am acquainted with the opinions of the gentlemen, and they undoubtedly have weight; but, that a specific matter of contagion has not been detected by chemical means, in the atmosphere of marshes, does not prove its non-existence. We know so little of those agents that affect the human constitution, that it is of no use to reason on this subject. There can be no doubt that the line of malaria above the Pontine marshes is marked by a dense fog morning and evening, and most of the old Roman towns were placed upon eminences out of the reach of this fog. I have myself experienced a peculiar effect upon the organs of smell in the neighbourhood of marshes in the evening after a very hot day; and the instances in which people have been seized with intermittents, by a single exposure, in a place infested by malaria in the season of fevers, gives, I think, a strong support to something like a poisonous material existing in the atmosphere in such spots; but I merely offer doubts. I hope the progress of physiology and of chemistry, will at no very distant time solve this important problem." Ambrosio now came forward, and bow-

ing to the stranger, said, he took the liberty, as he saw from his familiarity with the cicerone, that he was well acquainted with Pæstum, of asking him whether the masses of travertine, of which the Cyclo-pian walls and the temples were formed, were really produced by aqueous deposition from the river Silaro, as he had often heard reported. The stranger replied;—"that they were certainly produced by deposition from water; and such deposits are made by the Silaro. But I rather believe," he said, "that a lake in the immediate neighbourhood of the city furnished the quarry from which these stones were excavated; and, in half an hour, if you like, after you have finished your examinations of the temples with your guide, I will accompany you to the spot from which it is evident that large masses of the travertine, marmor tiburtinum or calcareous tufa, have been raised." We thanked him for his attention, accepted his invitation, took the usual walk round the temples, and returned to our new acquaintance, who led the way through the gate of the city to the banks of a pool or lake a short distance off. We walked to the borders on a mass of calcareous tufa, and we saw that this substance had even encrusted the reeds on the shore. There was something peculiarly melancholy in the character of this water: all the herbs around it were grey, as if encrusted with marble; a few buffaloes were slaking their thirst in it, which ran wildly away on our approach, and appeared to retire into a rocky excavation or quarry at the end of the lake; there were a number of birds, which, on examination, I found were sea-swallows flitting on the surface, and busily employed, with the libella or dragon-fly, in destroying the myriads of gnats which rose from the bottom, and were beginning to be very troublesome by their bites to

us. "There," said the stranger, "is, what I believe to be, the source of those large and durable stones which you see in the plain before you. This water rapidly deposits calcareous matter,—and even if you throw a stick into it, a few hours is sufficient to give it a coating of this substance. Whichever way you turn your eyes, you see masses of this recently-produced marble, the consequence of the overflowing of the lake during the winter floods, and in that large excavation, where you saw the buffaloes disappear, you may observe that immense masses have been removed, as if by the hand of art, and in remote times;—the marble that remains in the quarry, is of the same texture and character as that which you see in the ruins of Pæstum; and I think it is scarcely possible to doubt, that the builders of those extraordinary structures, derived a part of their materials from this spot. Ambrosio gave his assent to this opinion of the stranger; and I took the liberty of asking him as to the quantity of calcareous matter contained in solution in the lake, saying, that it appeared to me for so rapid and considerable an effect of deposition, there must be an unusual quantity of solid matter dissolved by the water, or some peculiar circumstance of solution. The stranger replied: "This water is like many, I may say, most of the sources, which rise at the foot of the Apennines; it holds carbonic acid in solution, which has dissolved a portion of the calcareous matter of the rock through which it has passed;—this carbonic acid is dissipated in the atmosphere; and the marble, slowly thrown down, assumes a crystalline form, and produces coherent stones. The lake before us is not particularly rich in the quantity of calcareous matter that it contains; for, as I have found by experience, a pint of it does not afford more than five or six grains; but the quantity of

fluid and the length of time are sufficient to account for the immense quantities of tufa and rock, which in the course of ages have accumulated in this situation.”—Onuphrio’s curiosity was excited by this statement of the stranger, and he said—“May I take the liberty of asking if you have any idea as to the cause of the large quantity of carbonic acid, which you have been so good as to inform us exists in most of the waters in this country?”—The stranger replied—“I certainly have formed an opinion on this subject, which I willingly state to you. It can, I think, be scarcely doubted, that there is a source of volcanic fire at no great distance from the surface, in the whole of southern Italy; and this fire, acting upon the calcareous rocks of which the Apennines are composed, must constantly detach from them carbonic acid, which, rising to the sources of the springs, deposited from the waters of the atmosphere, must give them their impregnation, and enable them to dissolve calcareous matter. I need not dwell upon Etna, Vesuvius, or the Lipari Islands, to prove that volcanic fires are still in existence; and, there can be no doubt, that in earlier periods almost the whole of Italy was ravaged by them; even Rome itself, the eternal city, rests upon the craters of extinct volcanoes; and I imagine that the traditional and fabulous record of the destruction made by the conflagration of Phaeton, in the chariot of the sun, and his falling into the Po, had reference to a great and tremendous igneous volcanic eruption, which extended over Italy, and ceased only near the Po, at the foot of the Alps. Be this as it may, the sources of carbonic acid are numerous, not merely in the Neapolitan, but likewise in the Roman and Tuscan States. The most magnificent waterfall in Europe, that of the Velino near Terni, is partly fed by a stream con-

taining calcareous matter dissolved by carbonic acid, and it deposits marble, which crystallizes, even in the midst of its thundering descent and foam, in the bed in which it falls. The Anio or Teverone, which almost approaches in beauty to the Velino, in the number and variety of its falls and cascades, is likewise a calcareous water; and, there is still a more remarkable one, which empties itself into this river below Tivoli, and which you have probably seen in your excursions in the campagna of Rome, called the lacus Albula or the lake of the Solfatara.”—Ambrosio said: “We remember it well, we saw it this very spring; we were carried there to examine some ancient Roman baths, and we were struck by the blue milkiness of the water, by the magnitude of the source, and by the disagreeable smell of sulphuretted hydrogen, which everywhere surrounded the lake.”—The stranger said; “When you return to Latium, I advise you to pay another visit to a spot, which is interesting from a number of causes, some of which I will take the liberty of mentioning to you. You have only seen one lake, that where the ancient Romans erected their baths, but there is another a few yards above it, surrounded by very high rushes, and almost hidden by them from the sight. This lake sends down a considerable stream of tepid water to the larger lake, but this water is less strongly impregnated with carbonic acid; the largest lake is actually a saturated solution of this gas, which escapes from it in such quantities in some parts of its surface, that it has the appearance of being actually in ebullition. I have found by experiment, that the water taken from the most tranquil part of the lake, even after being agitated and exposed to the air, contained in solution more than its own volume of carbonic acid gas, with a very small quantity

of sulphuretted hydrogen, to the presence of which, I conclude, its ancient use in curing cutaneous disorders, may be referred. Its temperature, I ascertained, was in the winter in the warmest parts above 80° of Fahrenheit, and it appears to be pretty constant; for I have found it differ a few degrees only, in the ascending source, in January, March, May, and the beginning of June; it is therefore supplied with heat from a subterraneous source, being nearly twenty degrees above the mean temperature of the atmosphere. Kircher has detailed, in his *Mundus Subterraneus*, various wonders respecting this lake, most of which are unfounded—such as that it is unfathomable, that it has at the bottom the heat of boiling water, and that floating islands rise from the gulf which emits it. It must certainly be very difficult, or even impossible to fathom a source, which rises with so much violence from a subterraneous excavation; and, at a time when chemistry had made small progress, it was easy to mistake the disengagement of carbonic acid for an actual ebullition. The floating islands are real; but neither the Jesuit nor any of the writers who have since described this lake, had a correct idea of their origin, which is exceedingly curious. The high temperature of this water, and the quantity of carbonic acid that it contains, render it peculiarly fitted to afford a pabulum or nourishment to vegetable life; the banks of travertine are everywhere covered with reeds, lichens, confervæ, and various kinds of aquatic vegetables; and, at the same time that the process of vegetable life is going on, the crystallizations of the calcareous matter, which is everywhere deposited, in consequence of the escape of carbonic acid, likewise proceed, giving a constant milkiness to what, from its tint, would otherwise be a blue fluid. So rapid is the vegetation, owing to

the decomposition of the carbonic acid, that even in winter, masses of *confervæ* and lichens, mixed with deposited travertine, are constantly detached by the currents of water from the bank, and float down the stream, which, being a considerable river, is never without many of these small islands on its surface: they are sometimes only a few inches in size, and composed merely of dark-green *confervæ*, or purple or yellow lichens; but they are sometimes even of some feet in diameter, and contain seeds, and various species of common water-plants, which are usually more or less incrustated with marble. There is, I believe, no place in the world where there is a more striking example of the opposition, or contrast of the laws of animate and inanimate nature, of the forces of inorganic chemical affinity, and those of the powers of life. Vegetables, in such a temperature, and everywhere surrounded by food, are produced with a wonderful rapidity; but the crystallizations are formed with equal quickness, and they are no sooner produced, than they are destroyed together. Notwithstanding the sulphureous exhalations from the lake, the quantity of vegetable matter generated there, and its heat, make it the resort of an infinite variety of insect tribes: and even in the coldest days in winter, numbers of flies may be observed on the vegetables surrounding its banks, or on its floating islands, and a quantity of their larvæ may be seen there, sometimes incrustated and entirely destroyed by calcareous matter, which is likewise often the fate of the insects themselves, as well as of various species of shell-fish that are found amongst the vegetables, which grow and are destroyed in the travertine on its banks. Snipes, ducks, and various water-birds often visit these lakes, probably attracted by the temperature, and the quantity

of food in which they abound ; but they usually confine themselves to the banks, as the carbonic acid disengaged from the surface would be fatal to them, if they ventured to swim upon it when tranquil. In May, 18—, I fixed a stick on a mass of travertine covered by the water, and I examined it in the beginning of the April following, for the purpose of determining the nature of the depositions. The water was lower at this time, yet I had some difficulty, by means of a sharp-pointed hammer, in breaking the mass which adhered to the bottom of the stick ; it was several inches in thickness. The upper part was a mixture of light tufa and the leaves of *confervæ* ; below this, was a darker and more solid travertine, containing black and decomposed masses of *confervæ* ; in the inferior part, the travertine was more solid, and of a grey colour, but with cavities, which I have no doubt were produced by the decomposition of vegetable matter. I have passed many hours, I may say, many days, in studying the phenomena of this wonderful lake ; it has brought many trains of thought into my mind, connected with the early changes of our globe, and I have sometimes reasoned from the forms of plants and animals preserved in marble in this warm source, to the grander depositions in the secondary rocks, where the zoophytes or coral insects have worked upon a grand scale, and where palms and vegetables, now unknown, are preserved with the remains of crocodiles, turtles, and gigantic extinct animals of the *sauri* genus, and which appear to have belonged to a period when the whole globe possessed a much higher temperature. I have likewise often been led from the remarkable phenomena surrounding me in that spot, to compare the works of man with those of nature. The baths, erected there nearly twenty centuries ago, present only heaps

of ruins; and even the bricks, of which they were built, though hardened by fire, are crumbled into dust, whilst the masses of travertine around it, though formed by a variable source from the most perishable materials, have hardened by time, and the most perfect remains of the greatest ruins in the eternal city, such as the triumphal arches and the Colosseum, owe their duration to this source. Then, from all we know, this lake, except in some change in its dimensions, continues nearly in the same state in which it was described 1700 years ago by Pliny, and I have no doubt contains the same kinds of floating islands, the same plants and the same insects. During the fifteen years that I have known it, it has appeared precisely identical in these respects; and yet, it has the character of an accidental phenomenon depending upon subterraneous fire. How marvellous then are those laws by which even the humblest types of organic existence are preserved, though born amidst the sources of their destruction, and by which a species of immortality is given to generations floating, as it were, like evanescent bubbles, on a stream raised from the deepest caverns of the earth, and instantly losing what may be called its spirit in the atmosphere."—These last observations of the stranger recalled to my recollection some phenomena which I had observed many years ago, and of which I could then give no satisfactory explanation. I was shooting in the marshes which surround the ruins of Gabia, and where there are still remains supposed to be of the Alexandrine aqueduct; I observed a small insulated hill, apparently entirely composed of travertine, and from its summit there were formations of tufa, which had evidently been produced by running water; but the whole mass was now perfectly dry and incrustated by vegetables. At first I suspected that this little moun-

tain had been formed by a jet of calcareous water,—a kind of small fountain analagous to the Geiser, which had deposited travertine, and continued to rise through the basin flowing from a higher level ; but the irregular form of the eminence did not correspond to this idea, and I remained perplexed with the fact, and unable to satisfy myself as to its cause. The views of the stranger appeared to me now to make it probable that the calcareous water had issued from ancient leaks in the aqueduct, and formed a hillock that had encased the bricks of the erection, which, in other parts where not encrusted by travertine, had become entirely decayed, degraded and removed from the soil. I mentioned the circumstance, and my suspicion of its nature. The stranger said, “ You are perfectly correct in your idea. I know the spot well, and if you had not mentioned it, I should probably have quoted it as an instance in which the works of art are preserved, as it were, by the accidents of nature. I was so struck by this appearance last year, that I had the travertine partially removed by some workmen, and I found beneath it the canal of the aqueduct in a perfect state, and the bricks of the arches as uninjured as if freshly laid.” The stranger had hardly concluded this sentence, when he was interrupted by Onuphrio, who said, “ I have always supposed, that in every geological system water is considered as the cause of the destruction or degradation of the surface ; but, in all the instances that you have mentioned, it appears rather as a conservative power, not destroying, but rather producing.” “ It is the general vice of philosophical systems,” replied the stranger, “ that they are usually founded upon a few facts, which they well explain, and are extended by the human fancy to all the phenomena of nature, to many of which they must be

contradictory. The human intellectual powers are so feeble, that they can, with difficulty, embrace a single series of phenomena, and they consequently must fail when extended to the whole of nature. Water by its common operation, as poured down from the atmosphere in rain and torrents, tends to level and degrade the surface, and carries the material of the land into the bosom of the ocean. Fire, on the contrary, in volcanic eruptions, usually raises mountains, exalts the surface, and creates islands even in the midst of the sea. But these laws are not invariable, as the instances to which we have just referred prove; and parts of the surface of the globe are sometimes destroyed even by fire, of which examples may be seen in the Phlegreæan fields; and islands, raised by one volcanic eruption, have been immersed in the sea by another. There are, in fact, no accidents in nature; what we call accidents are the results of general laws in particular operation, but we cannot deduce these laws from the particular operation, or the general order from the partial result." Ambrosio said to the stranger, "You appear, Sir, to have paid so much attention to physical phenomena, that few things would give us more pleasure than to know your opinion respecting the early changes and physical history of the globe, for I perceive you do not belong to the modern geological schools." The stranger said, "I have certainly formed opinions, or rather speculations on these subjects, but I fear they are hardly worth communicating; they have sometimes amused me in hours of idleness, but I doubt if they will amuse others." I said, "The observations which you have already been so kind as to communicate to us, on the formation of the travertine, lead us not only to expect amusement, but likewise instruction."

THE STRANGER.—On these matters I had facts to communicate ; on the geological scheme of the early history of the globe there are only analogies to guide us, which different minds may apply and interpret in different ways ; but, I will not trifle with a long preliminary discourse. Astronomical deductions and actual measures by triangulation prove, that the globe is an oblate spheroid flattened at the poles ; and, this form we know, by strict mathematical demonstrations, is precisely the one which a fluid body revolving round its axis, and become solid at its surface by the slow dissipation of its heat or other causes, would assume. I suppose, therefore, that the globe, in the first state in which the imagination can venture to consider it, was a fluid mass, with an immense atmosphere revolving in space round the sun, and that by its cooling, a portion of its atmosphere was condensed in water, which occupied a part of the surface. In this state, no forms of life, such as now belong to our system, could have inhabited it ; and, I suppose the crystalline rocks, or as they are called by geologists, the primary rocks, which contain no vestiges of a former order of things, were the results of the first consolidation on its surface. Upon the further cooling, the water, which more or less had covered it, contracted ; depositions took place, shell fish and coral insects of the first creation began their labours ; and islands appeared in the midst of the ocean, raised from the deep by the productive energies of millions of zoophytes. These islands became covered with vegetables fitted to bear a high temperature, such as palms and various species of plants, similar to those which now exist in the hottest parts of the world. And, the submarine rocks or shores of these new formations of land became covered with aquatic vegetables, on which va-

rious species of shell-fish and common fishes found their nourishment. The fluids of the globe in cooling deposited a large quantity of the materials they held in solution, and these deposits agglutinating together the sand, the immense masses of coral rock, and some of the remains of the shells and fishes found round the shores of the primitive lands, produced the first order of secondary rocks. As the temperature of the globe became lower, species of the oviparous reptiles were created to inhabit it;—and the turtle, crocodile, and various gigantic animals of the sauri kind, seem to have haunted the bays and waters of the primitive lands. But in this state of things there was no order of events similar to the present;—the crust of the globe was exceedingly slender, and the source of fire a small distance from the surface. In consequence of contraction in one part of the mass, cavities were opened, which caused the entrance of water, and immense volcanic explosions took place, raising one part of the surface, depressing another, producing mountains, and causing new and extensive depositions from the primitive ocean. Changes of this kind must have been extremely frequent in the early epochas of nature; and the only living forms of which the remains are found in the strata that are the monuments of these changes, are those of plants, fishes, birds, and oviparous reptiles, which seem most fitted to exist in such a war of the elements. When these revolutions became less frequent, and the globe became still more cooled, and the inequalities of its temperature preserved by the mountain chains, more perfect animals became its inhabitants, many of which, such as the mammoth, megalonix, megatherium, and gigantic hyena, are now extinct. At this period, the temperature of the ocean seems to have been not much higher

than it is at present, and the changes produced, by occasional eruptions of it, have left no consolidated rocks. Yet, one of these eruptions appears to have been of great extent and some duration, and seems to have been the cause of those immense quantities of water-worn stones, gravel, and sand, which are usually called diluvian remains; and, it is probable that this effect was connected with the elevation of a new continent in the southern hemisphere by volcanic fire. When the system of things became so permanent, that the tremendous revolutions, depending upon the destruction of the equilibrium between the heating and cooling agencies, were no longer to be dreaded, the creation of man took place; and since that period there has been little alteration in the physical circumstances of our globe. Volcanos sometimes occasion the rise of new islands, portions of the old continents are constantly washed by rivers into the sea, but these changes are too insignificant to affect the destinies of man, or the nature of the physical circumstances of things. On the hypothesis that I have adopted, however, it must be remembered, that the present surface of the globe is merely a thin crust surrounding a nucleus of fluid ignited matter; and consequently we can hardly be considered as actually safe from the danger of a catastrophe by fire.

Onuphrio said, "From the view you have taken, I conclude that you consider volcanic eruptions as owing to the central fire; indeed their existence offers, I think, an argument for believing that the interior of the globe is fluid." The stranger answered; "I beg you to consider the views I have been developing as merely hypothetical, one of the many resting places that may be taken by the imagination in considering this subject. There are, however, distinct facts in favour of the idea,

that the interior of the globe has a higher temperature than the surface ; the heat increasing in mines the deeper we penetrate, and the number of warm sources which rise from great depths, in almost all countries, are certainly favourable to the idea. The opinion that volcanos are owing to this general and simple cause, is I think likewise more agreeable to the analogies of things, than to suppose them dependent upon partial chemical changes, such as the action of air and water upon the combustile bases of the earths and alkalies, though it is extremely probable that these substances may exist beneath the surface, and may occasion some results of volcanic fire ; and, on this subject, my notion may perhaps be more trusted, as for a long while I thought volcanic eruptions were owing to chemical agencies of the newly discovered metals of the earths and alkalies, and I made many and some dangerous experiments in the hope of confirming this notion, but in vain."

AMB.—We are very much obliged to you for your geological illustrations ; but they remind me a little of some of the ideas of our friend Philaethes in his remarkable vision, and with which we may at some time amuse you in return for your geology, should we be honoured with more of your company. You are obliged to have recourse to creations for all the living beings in your philosophical romance ; I do not see why you should not suppose creations or arrangements of dead matter by the same laws of infinite wisdom, and why our globe should not rise at once a divine work fitted for all the objects of living and intelligent natures.

The stranger replied. "I have merely attempted a philosophical history founded upon the facts known respecting rocks and strata and the remains they con-

tain. I begin with what may be considered a creation, a fluid globe supplied with an immense atmosphere, and the series of phenomena which I imagine consequent to the creation, I suppose produced by powers impressed upon matter by omnipotence."

Ambrosio said, "There is this verisimilitude in your history, that it is not contradictory to the little we are informed by revelation as to the origin of the globe, the order produced in the chaotic state, and the succession of living forms generated in the days of creation, which may be what philosophers call 'the epochas of nature,' for a day with omnipotence is as a thousand years, and a thousand years as one day."

"I must object," Onuphrio said, "to your interpretation of the scientific view of our new acquaintance, and to your disposition to blend them with the cosmogony of Moses. Allowing the divine origin of the book of Genesis, you must admit that it was not intended to teach the Jews systems of philosophy, but the laws of life and morals; and a great man and an exalted Christian raised his voice two centuries ago against this mode of applying and of often wresting the sense of the scriptures to make them conformable to human fancies; 'from which,' says Lord Bacon, 'arise not only false and fantastical philosophies, but likewise heretical religions.' If the scriptures are to be literally interpreted and systems of science found in them, Gallileo Gallilei merited his persecution, and we ought still to believe that the sun turns round the earth."

AMB.—You mistake my view, Onuphrio, if you imagine I am desirous of raising a system of geology on the book of Genesis. It cannot be doubted that the first man was created with a great variety of instinctive or inspired knowledge, which must have been likewise

enjoyed by his descendants; and some of this knowledge could hardly fail to have related to the globe which he inhabited and to the objects which surrounded him. It would have been impossible for the human mind to have embraced the mysteries of creation; or to have followed the history of the moving atoms from their chaotic disorder into their arrangement in the visible universe, to have seen dead matter assuming the forms of life and animation, and light and power arising out of death and sleep. The ideas therefore transmitted to or presented by Moses respecting the origin of the world and of man were of the most simple kind, and such as suited the early state of society; but, though general and simple truths, they were divine truths, yet clothed in a language and suited to the ideas of a rude and uninstructed people. And, when I state my satisfaction in finding that they are not contradicted by the refined researches of modern geologists, I do not mean to deduce from them a system of science. I believe that light was the creation of an act of the divine will, but I do not mean to say that the words "Let there be light, and there was light," were orally spoken by the Deity; nor, do I mean to imply, that the modern discoveries respecting light are at all connected with this sublime and magnificent passage.

ONU.—Having resided for a long time at Edinburgh, and having heard a number of discussions on the theory of Dr. Hutton, or the plutonic theory of geology, and having been exceedingly struck both by its simplicity and beauty, its harmony with existing facts and the proofs afforded to it by some beautiful chemical experiments, I do not feel disposed immediately to renounce it for the views which I have just heard explained; for

the principal facts which our new acquaintance has stated are, I think, not inconsistent with the refined philosophical systems of Professor Playfair and Sir James Hall.

THE UNKNOWN.—I have no objection to the *refined plutonic view*, as capable of explaining many existing phenomena; indeed you must be aware, that I have myself had recourse to it. What I contend against is, its application to explain the formations of the secondary rocks, which I think clearly belong to an order of facts not at all embraced by it. In the plutonic system, there is one simple and constant order assumed, which may be supposed eternal. The surface is constantly imagined to be disintegrated, destroyed, degraded and washed into the bosom of the ocean by water, and as constantly consolidated, elevated and regenerated by fire; and, the ruins of the old form the foundations of the new world. It is supposed that there are always the same types both of dead and living matter, that the remains of rocks, of vegetables and animals of one age are found imbedded in rocks raised from the bottom of the ocean in another. Now to support this view, not only the remains of living beings, which at present people the globe, might be expected to be found in the oldest secondary strata; but even those of the arts of man, the most powerful and populous of its inhabitants, which is well known not to be the case. On the contrary, each stratum of the secondary rocks contains remains of peculiar and mostly now unknown species of vegetables and animals. In those strata which are deepest, and which must consequently be supposed to be the earliest deposited, forms even of vegetable life are rare; shells and vegetable remains are found in the next order; the bones of fishes and oviparous reptiles exist in the fol-

lowing class; the remains of birds, with those of the same genera mentioned before, in the next order; those of quadrupeds of extinct species, in a still more recent class; and, it is only in the loose and slightly consolidated strata of gravel and sand, and which are usually called diluvian formations, that the remains of animals, such as now people the globe, are found with others belonging to extinct species. But in none of these formations, whether called secondary, tertiary, or diluvial, have the remains of man or any of his works been discovered. It is, I think, impossible to consider the organic remains found in any of the earlier secondary strata, the lias-limestone, and its congenerous formations, for instance, without being convinced that the beings, whose organs they formed, belonged to an order of things entirely different from the present. Gigantic vegetables, more nearly allied to the palms of the equatorial countries than to any other plants, can only be imagined to have lived in a very high temperature; and the immense reptiles, the megalosauri, with paddles instead of legs, and clothed in mail, in size equal, or even superior, to the whale; and the great amphibia, plethiosauri with bodies like turtles, but furnished with necks longer than their bodies, probably to enable them to feed on vegetables growing in the shallows of the primitive ocean, seem to show a state in which low lands or extensive shores rose above an immense calm sea,—and when there were no great mountain chains to produce inequalities of temperature, tempests, or storms. Were the surface of the earth now to be carried down into the depths of the ocean, or were some great revolution of the waters to cover the existing land, and it was again to be elevated by fire, covered with consolidated depositions of sand or mud, how entirely different

would it be in its characters from any of the secondary strata. Its great features would undoubtedly be the works of man; hewn stones and statues of bronze and marble, and tools of iron, and human remains would be more common than those of animals, on the greatest part of the surface; the columns of Pæstum or of Agrigentum, or the immense iron and granite bridges of the Thames, would offer a striking contrast to the bones of the crocodiles or sauri in the older rocks, or even to those of the mammoth or elephas primigenius in the diluvial strata. And, whoever dwells upon this subject, must be convinced that the present order of things and the comparatively recent existence of man, as the master of the globe, is as certain as the destruction of a former and a different order, and the extinction of a number of living forms which have now no types in being, and which have left their remains wonderful monuments of the revolutions of nature.

ONU.—I am not quite convinced by your arguments. Supposing the lands of New Holland were to be washed into the depths of the ocean, and to be raised, according to the Huttonian view, as a secondary stratum, by subterraneous fire, they would contain the remains of both vegetables and animals entirely different from any found in the strata of the old continents; and may not those peculiar formations to which you have referred, be, as it were, accidents of nature belonging to peculiar parts of the globe? And, you speak of a diluvian formation, which I conclude you would identify with that belonging to the catastrophe described in the sacred writings, in which no human remains are found; now, you surely will not deny, that man existed at the time of this catastrophe, and he consequently may have existed at the period of the other revolutions, which are supposed to

be produced in the Huttonian views by subterraneous fire.

THE UNKNOWN.—I have made use of the term diluvian, because it has been adopted by geologists, but without meaning to identify the cause of the formations with the deluge described in the sacred writings; I apply the term merely to signify loose and water-worn strata not at all consolidated, and deposited by an inundation of water; and in these countries which they have covered, man certainly did not exist. With respect to your argument derived from New Holland, it appears to me to be without weight. In a variety of climates, and in very distant parts of the globe, secondary strata of the same order are found, and they contain always the same kind of organic remains, which are entirely different from any of those now afforded by beings belonging to the existing order of things. The catastrophes which produced the secondary strata and diluvian depositions, could not have been local and partial phenomena, but must have extended over the whole, or a great part of the surface of the globe: the remains of similar shell fishes are found in the limestones of the old and new continents; the teeth of the mammoth are not uncommon in various parts of Europe; entire skeletons have been found in America, and even the skin covered with hair and the entire body of one of these enormous extinct animals has been discovered in Siberia preserved in a mass of ice. In the oldest secondary strata, there are no remains of such animals as now belong to the surface, and in the rocks which may be regarded as more recently deposited, these remains occur but rarely and with abundance of extinct species;—there seems, as it were, a gradual approach to the present system of things and a succession of destructions and creations prepara-

tory to the existence of man. It will be useless to push these arguments farther. You must allow that it is impossible to defend the proposition, that the present order of things, is the ancient and constant order of nature, only modified by existing laws, and consequently, the view which you have supported must be abandoned. The monuments of extinct generations of animals are as perfect as those of extinct nations; and it would be more reasonable to suppose that the pillars and temples of Palmyra were raised by the wandering Arabs of the desert, than to imagine that the vestiges of peculiar animated forms in the strata beneath the surface belonged to the early and infant families of the beings that at present inhabit it.

ONU.—I am convinced;—I shall push my arguments no further, for I will not support the sophisms of that school, which supposes that living nature has undergone gradual changes by the effects of its irritabilities and appetencies; that the fish has in millions of generations ripened into the quadruped, and the quadruped into the man; and that the system of life by its own inherent powers has fitted itself to the physical changes in the system of the universe. To this absurd, vague, atheistical doctrine, I prefer even the dream of plastic powers, or that other more modern dream, that the secondary strata were *created*, filled with remains as it were of animal life to confound the speculations of our geological reasoners.

THE UNKNOWN.—I am glad you have not retreated into the desert and defenceless wilderness of scepticism, or of false and feeble philosophy. I should not have thought it worth my while to have followed you there; I should as soon think of arguing with the peasant who informs me that the basaltic columns of Antrim or of

Staffa were the works of human art, and raised by the giant Finmacoul.

At this moment, one of our servants came to inform me, that a dinner which had been preparing for us at the farm-house was ready;—we asked the stranger to do us the honour to partake of our repast; he assented, and the following conversation took place at table.

PHIL.—In reflecting upon our discussions this morning, I cannot help being a little surprised at their nature; we have been talking only of geological systems, when a more natural subject for our conversation would have been these magnificent temples, and an inquiry into the race by whom they were raised and the gods to whom there were dedicated. We are now treading on a spot which contains the bones of a highly civilized and powerful people; yet we are almost ignorant of the names they bore, and the period of their greatness is lost in the obscurity of time.

AMB.—There can be no doubt that the early inhabitants of this city were Grecians and a maritime and commercial people;—they have been supposed to belong to the Sybarite race, and the roses producing flowers twice a-year in the spring and autumn in ancient times here, might sanction the idea that this balmy spot was chosen by a colony who carried luxury and refinement to the highest pitch.

ONU.—To attempt to form any opinion with respect to the people that anciently inhabited these now deserted plains is useless, and a vain labour. In the geological conversation which took place before dinner, some series of interesting facts were presented to us; and the monuments of nature, though they do not speak a distinct language, yet speak an intelligible one;

—but with respect to Pæstum, there is neither history nor tradition to guide us; and we shall do wisely to resume our philosophical inquiries, if we have not already exhausted the patience of our new guest by doubts or objections to his views.

THE STRANGER.—One of you referred in our conversation this morning to a *vision*, which had some relation to the subject of our discussion, and I was promised some information on this matter.

I immediately gave a sketch of my vision, and of the opinions which had been expressed by Ambrosio on the early history of man, and the termination of our discussions on religion.

THE STRANGER.—I agree with Ambrosio in opinion on the subjects you have just mentioned. In my youth, I was a sceptic; and this I believe is usually the case with young persons given to general and discursive reading, and accustomed to adopt something like a mathematical form in their reasonings; and it was in considering the nature of the intellectual faculties of brutes, as compared with those of man, and in examining the nature of instinctive powers, that I became a believer. After I had formed the idea that revelation was to man in the place of an instinct, my faith constantly became stronger; and it was exalted by many circumstances I had occasion to witness in a journey that I made through Egypt and a part of Asia Minor, and by no one more than by a very remarkable dream which occurred to me in Palestine, and which, as we are now almost at the hour of the siesta, I will relate to you, though perhaps you will be asleep before I have finished it. I was walking along that deserted shore which contains the ruins of Ptolemais, one of the most ancient ports of Judæa. It was evening; the sun was sinking in the sea; I seated

myself on a rock, lost in melancholy contemplations on the destinies of a spot once so famous in the history of man. The calm Mediterranean, bright in the glowing light of the west, was the only object before me. "These waves," I said to myself, "once bore the ships of the monarch of Jerusalem, which were freighted with the riches of the East to adorn and honour the sanctuary of Jehovah: here are now no remains of greatness or of commerce, a few red stones and broken bricks only mark what might have been once a flourishing port, and the citadel above, raised by the Saracens, is filled with Turkish soldiers." The janissary, who was my guide, and my servant, were preparing some food for me in a tent which had been raised for the purpose, and whilst waiting for their summons to my repast, I continued my reveries, which must gradually have ended in slumber. I saw a man approaching towards me, whom, at first, I took for my janissary, but as he came nearer I found a very different figure; he was a very old man with a beard as white as snow; his countenance was dark, but paler than that of an Arab, and his features stern, wild, and with a peculiar, savage expression; his form was gigantic, but his arms were withered, and there was a large scar on the left side of his face which seemed to have deprived him of an eye. He wore a black turban and black flowing robes, and there was a large chain round his waist which clanked as he moved. It occurred to me that he was one of the santons or sacred madmen so common in the East, and I retired as he approached towards me. He called out "Fly not, stranger, fear me not, I will not harm you, you shall hear my story, it may be useful to you." He spoke in Arabic, but in a peculiar dialect and to me new, yet I understood every word. "You see before you," he

said, “ a man who was educated a Christian, but who renounced the worship of the one supreme God for the superstitions of the pagans. I became an apostate in the reign of the emperor Julian, and I was employed by that sovereign to superintend the re-erection of the temple of Jerusalem, by which it was intended to belie the prophecies and give the death-blow to the holy religion. History has informed you of the result ; my assistants were most of them destroyed in a tremendous storm, I was blasted by lightning from heaven (he raised his withered hand to his face and eye) but suffered to live, and expiate my crime in the flesh. My life has been spent in constant and severe penance, and in that suffering of the spirit produced by guilt, and is to be continued as long as any part of the temple of Jupiter in which I renounced my faith, remains in this place. I have lived through fifteen tedious centuries, but I trust in the mercies of Omnipotence, and I hope my atonement is completed. I now stand in the dust of the pagan temple. You have just thrown the last fragment of it over the rock. My time is arrived, I come ! ” As he spake the last words, he rushed towards the sea, threw himself from the rock and disappeared. I heard no struggling, and saw nothing but a gleam of light from the wave that closed above him. I was now roused by the cries of my servant and of the janissary, who were shaking my arm, and who informed me that my sleep was so sound that they were alarmed for me. When I looked on the sea, there was the same light, and I seemed to see the very spot in the wave where the old man had sunk. I was so struck by the vision, that I asked if they had not seen something dash into the wave, and if they had not heard somebody speaking to me as they arrived. Of course their answers were

negative. In passing through Jerusalem and in coasting the Dead Sea I had been exceedingly struck by the present state of Judæa and the conformity of the fate of the Jewish nation to the predictions of our Saviour; I had likewise been reading Gibbon's eulogy of Julian, and his account of the attempts made by that emperor to rebuild the temple: so that the dream at such a time and in such a place was not an unnatural occurrence, yet it was so vivid, and the image of the subject of it so peculiar, that it long affected my imagination, and whenever I recurred to it, strengthened my faith.

ONU.—I believe all the narratives of apparitions and ghost stories are founded upon dreams of the same kind as that which occurred to you; an ideal representation of events in the local situation in which the person is at the moment, and when the imaginary picture of the place in sleep exactly coincides with its reality in waking.

THE STRANGER.—I agree with you in your opinion. If my servant had not been with me, and my dream had been a little less improbable, it would have been difficult to have persuaded me that I had not been visited by an apparition.

I mentioned the dream of Brutus, and said, "His supposed evil genius appeared in his tent; had the philosophical hero dreamt that his genius had appeared to him in Rome, there could have been no delusion." I cited the similar vision, recorded of Dion before his death, by Plutarch, of a gigantic female, one of the fates or furies, who was supposed to have been seen by him when reposing in the portico of his palace. I referred likewise to my own vision of the beautiful female, the guardian angel of my recovery, who always seemed to me to be present at my bedside.

AMB.—In confirmation of this opinion of Onuphrio,

I can mention many instances. I once dreamt that my door had been forced, that there were robbers in my room, and that one of them was actually putting his hand before my mouth to ascertain if I was sleeping naturally; I awoke at this moment, and was some minutes before I could be sure whether it was a dream or a reality; I felt the pressure of the bedclothes on my lips, and still in the fear of being murdered, continued to keep my eyes closed and to breathe slowly, till hearing nothing and finding no motion, I ventured to open my eyes, but even then, when I saw nothing, I was not sure that my impression was a dream till I had risen from my bed and ascertained that the door was still locked.

ONU.—I am the only one of the party unable to record any dreams of the vivid and peculiar nature you mention from my own experience; I conclude it is owing to the dulness of my imagination. I suppose the more intense power of reverie is a symptom of the poetical temperament; and perhaps, if I possessed more enthusiasm, I should always have possessed more of the religious instinct. To adopt the idea of Philalethes of hereditary character, I fear my forefathers have not been correct in their faith.

AMB.—Your glory will be greater in establishing a new character, and I trust even the conversation of this day has given you an additional reason to adopt *our* faith.

Ambrosio spoke these last words with an earnestness unusual in him, and with something of a tone which marked a zeal for proselytism, and at the same time he cast his eyes on the rosary which was suspended round the neck of the stranger, and said, "I hope I am not indiscreet in saying *our* faith."

THE STRANGER.—I was educated in the ritual of the church of England; I belong to the church of Christ; the rosary which you see suspended round my neck, is a memorial of sympathy and respect for an illustrious man. I will, if you will allow me, give you the history of it, which, I think, from the circumstances with which it is connected, you will not find devoid of interest. I was passing through France in the reign of Napoleon, by the peculiar privilege granted to a savant, on my road into Italy. I had just returned from the Holy Land, and had in my possession two or three of the rosaries which are sold to pilgrims at Jerusalem as having been suspended in the holy sepulchre. Pius VII. was then in imprisonment at Fontainebleau. By a special favour, on a plea of my return from the Holy Land, I obtained permission to see this venerable and illustrious pontiff. I carried with me one of my rosaries. He received me with great kindness; I tendered my services to execute any commissions, not political ones, he might think fit to entrust me with in Italy, informing him that I was an Englishman; he expressed his thanks, but declined troubling me. I told him I was just returned from the Holy Land, and bowing with great humility, offered to him my rosary from the holy sepulchre; he received it with a smile, touched it with his lips, gave his benediction over it and returned it into my hands, supposing of course that I was a Roman catholic. I had meant to present it to his holiness, but the blessing he had bestowed upon it and the touch of his lips, made it a precious relic to me, and I restored it to my neck, round which it has ever since been suspended. He asked me some unimportant questions respecting the state of the Christians at Jerusalem; and on a sudden, turned the subject much to my surprise, to the destruction of the

French in Russia, and in an exceedingly low tone of voice, as if afraid of being overheard, he said, “The *nefas* has long been triumphant over the *fas*, but I do not doubt that the balance of things is even now restoring, that God will vindicate his church, clear his polluted altars, and establish society upon its permanent basis of justice and faith; we shall meet again, adieu!” and he gave me his paternal blessing. It was eighteen months after this interview, that I went out with almost the whole population of Rome, to receive and welcome the triumphal entry of this illustrious father of the church into his capital. He was borne on the shoulders of the most distinguished artists, headed by Canova; and never shall I forget the enthusiasm with which he was received,—it is impossible to describe the shouts of triumph and of rapture sent up to heaven by every voice. And when he gave his benediction to the people, there was an universal prostration, a sobbing and marks of emotions of joy almost like the bursting of the heart; I heard, every where around me cries of “the holy Father, the most holy Father, his restoration is the work of God!” I saw tears streaming from the eyes of almost all the women about me, many of them were sobbing hysterically, and old men were weeping as if they had been children. I pressed my rosary to my breast on this occasion, and repeatedly touched with my lips, that part of it which had received the kiss of the most venerable pontiff. I preserve it with a kind of hallowed feeling as the memorial of a man, whose sanctity, firmness, meekness and benevolence are an honour to his church and to human nature; and it has not only been useful to me, by its influence upon my own mind, but it has enabled me to give pleasure to others, and has I believe been sometimes beneficial in

insuring my personal safety. I have often gratified the peasants of Apulia and Calabria by presenting them to kiss a rosary from the holy sepulchre which had been hallowed by the touch of the lips and benediction of the pope; and, it has been even respected by and procured me a safe passage through a party of brigands, who once stopped me in the passes of the Apennines.

ONU.—The use you have made of this relic puts me in mind of a device of a very ingenious geological philosopher now living. He was on Etna and busily employed in making a collection of the lavas formed from the igneous currents of that mountain; the peasants were often troublesome to him, suspecting that he was searching for treasures. It occurred to him, to make the following speech to them; “I have been a great sinner in my youth, and as a penance I have made a vow to carry away with me pieces of every kind of stone found upon the mountain; permit me quietly to perform my pious duty, that I may receive absolution for my sins.” The speech produced the desired effect; the peasants shouted, “the holy man, the saint,” and gave him every assistance in their power to enable him to carry off his burthen, and he made his ample collections with the utmost security and in the most agreeable manner.

THE STRANGER.—I do not approve of pious frauds even for philosophical purposes: my rosary excited in others, the same kind of feeling which it excited in my own bosom, and which I hold to be perfectly justifiable, and of which I shall never be ashamed.

AMB.—You must have travelled in Italy in very dangerous times; have you always been secure?

THE STRANGER.—Always; I have owed my security, partly, as I have said, to my rosary, but more to my

dress and my acquaintance with the dialect of the natives; I have always carried with me a peasant as a guide, who has been intrusted with the small sums of money I wanted for my immediate purposes, and my baggage has been little more than a cynic philosopher would have carried with him, and when I have been unable to walk, I have trusted myself to the conduct of a vetturino, a native of the province, with his single mule and caratella.

The sun was now setting, and the temple of Neptune was glowing with its last purple rays. We were informed that our horses were waiting, and that it was time for us to depart to our lodgings at Eboli. I asked the stranger to be our companion, and to do us the honour to accept of a seat in our carriage: he declined the invitation, and said "my bed is prepared in the casina here for this night, and to-morrow I proceed on a journey connected with scientific objects in the parts of Calabria the scene of the terrible earthquakes of 1783." I held out my hand to him in parting, he gave it a strong and warm pressure, and said, "Adieu, we shall meet again."

DIALOGUE THE FOURTH.

THE PROTEUS, OR IMMORTALITY.

THE impression made upon my mind by the stranger, with whom we became acquainted at Pæstum, was of the strongest and most extraordinary kind. The memory of his person, his dress, his manners, the accents of his voice, and the tone of his philosophy,

for a long while haunted my imagination in a most unaccountable manner, and even formed a part of my dreams. It often occurred to me, that this was not the first time that I had seen him, and I endeavoured, but in vain, to find some type or image of him in former scenes of my life. I continually made inquiries respecting him amongst my acquaintance, but I could never be sure that any of them knew him, or even had seen him. So great were his peculiarities, that he must have escaped observation altogether, for had he entered the world at all he must have made some noise in it. I expressed so much interest on this subject, that at last it became a source of ridicule amongst my acquaintance, who often asked me, if I had not yet obtained news of my spirit-friend or ghost-seer.

After my return from Naples to Rome, I was almost immediately recalled to England by a melancholy event, the death of a very near and dear relation, and I left my two friends, Ambrosio and Onuphrio, to pursue their travels, which were intended to be of some extent and duration.

In my youth, and through the prime of manhood, I never entered London without feelings of pleasure and hope. It was to me as the grand theatre of intellectual activity, the field of every species of enterprise and exertion, the metropolis of the world of business, thought, and action. There I was sure to find the friends and companions of my youth, to hear the voice of encouragement and praise. There society of the most refined kind offered daily its banquets to the mind, with such variety that satiety had no place in them, and new objects of interest and ambition were constantly exciting attention either in politics, literature, or science.

I now entered this great city in a very different tone of mind, one of settled melancholy, not merely produced by the mournful event which recalled me to my country, but owing likewise to an entire change in the condition of my physical, moral, and intellectual being. My health was gone, my ambition was satisfied, I was no longer excited by the desire of distinction; what I regarded most tenderly, was in the grave; and, to take a metaphor, derived from the change produced by time in the juice of the grape, my cup of life was no longer sparkling, sweet, and effervescent;—it had lost its sweetness, without losing its power,—and it had become bitter.

After passing a few months in England, and enjoying (as much as I could enjoy anything) the society of the few friends who still remained alive, the desire of travel again seized me. I had preserved, amidst the wreck of time, one feeling strong and unbroken, the love of natural scenery; and this, in advanced life, formed a principal motive for my plans of conduct and action. Of all the climates of Europe, England seems to me most fitted for the activity of the mind, and the least suited to repose. The alterations of a climate so various and rapid, continually awake new sensations; and the changes in the sky from dryness to moisture, from the blue ethereal to cloudiness and fogs, seem to keep the nervous system in a constant state of disturbance. In the mild climate of Nice, Naples, or Sicily, where even in winter it is possible to enjoy the warmth of the sunshine in the open air beneath palm-trees, or amidst ever-green groves of orange-trees, covered with odorous fruit and sweet-scented leaves, mere existence is a pleasure,—and even the pains of disease are sometimes forgotten amidst the balmy influence of nature, and a series of agreeable and uninterrupted sensations invite

to repose and oblivion. But, in the changeful and tumultuous atmosphere of England, to be tranquil is a labour; and employment is necessary to ward off the attacks of ennui. The English, as a nation, are pre-eminently active; and the natives of no other country follow their objects with so much force, fire, and constancy. And, as human powers are limited, there are few examples of very distinguished men living in this country to old age; they usually fail, droop and die before they have attained the period naturally marked for the end of human existence. The lives of our statesmen, warriors, poets, and even philosophers, offer abundant proofs of the truth of this opinion; whatever burns consumes, ashes remain. Before the period of youth is passed, grey hairs usually cover those brows which are adorned with the civic oak or the laurel; and in the luxurious and exciting life of the man of pleasure, their tints are not even preserved by the myrtle-wreath or the garland of roses from the premature winter of time.

In selecting the scenes for my new journey, I was guided by my former experience. I know no country more beautiful than that which may be called the Alpine country of Austria, including the Alps of the southern Tyrol, those of Illyria, the Noric, and the Julian Alps, and the Alps of Styria and Salzburg. The variety of the scenery, the verdure of the meadows and trees, the depths of the valleys, the altitude of the mountains, the clearness and grandeur of the rivers and lakes, give it, I think, a decided superiority over Switzerland. And the people are far more agreeable: various in their costumes and manners, Illyrians, Italians, or Germans, they have all the same simplicity of character, and are all distinguished by their love of their country, their devotion to their sovereign, the warmth and purity of

their faith, their honesty, and (with very few exceptions) I may say, their great civility and courtesy to strangers.

In the prime of life I had visited this region in a society which afforded me the pleasures of intellectual friendship, and the delights of refined affection : later, I had left the burning summer of Italy, and the violence of an unhealthy passion, and had found coolness, shade, repose, and tranquillity there : in a still more advanced period, I had sought for and found consolation, and partly recovered my health after a dangerous illness, the consequence of labour and mental agitation ; there I had found the spirit of my early vision. I was desirous, therefore, of again passing some time in these scenes, in the hope of re-establishing a broken constitution ; and though this hope was a feeble one, yet, at least, I expected to spend a few of the last days of life more tranquilly and more agreeably, than in the metropolis of my own country. Nature never deceives us ; the rocks, the mountains, the streams, always speak the same language : a shower of snow may hide the verdant woods in spring, a thunder-storm may render the blue limpid streams foul and turbulent ; but these effects are rare and transient,—in a few hours, or at least days, all the sources of beauty are renovated. And nature affords no continued trains of misfortunes and miseries, such as depend upon the constitution of humanity, no hopes for ever blighted in the bud, no beings full of life, beauty, and promise taken from us in the prime of youth. Her fruits are all balmy, bright, and sweet ; she affords none of those blighted ones so common in the life of man, and so like the fabled apples of the Dead Sea, fresh and beautiful to the sight, but when tasted, full of bitterness and ashes. I have already mentioned the strong effect

produced on my mind by the stranger, whom I had met so accidentally at Pæstum; the hope of seeing him again was another of my motives for wishing to leave England, and (why I know not) I had a decided presentiment that I was more likely to meet him in the Austrian States than in England, his own country.

For this journey I had one companion, an early friend and medical adviser. He had lived much in the world, had acquired a considerable fortune, had given up his profession, was now retired, and sought, like myself in this journey, repose of mind, and the pleasures derived from natural scenery. He was a man of a very powerful and acute understanding; but had less of the poetical temperament, than any person whom I had ever known with similar vivacity of mind. He was a severe thinker, with great variety of information, an excellent physiologist, and an accomplished naturalist. In his reasonings, he adopted the precision of a geometer, and was always upon his guard against the influence of imagination. He had passed the meridian of life, and his health was weak like my own, so that we were well suited as travelling companions, moving always slowly from place to place without hurry or fatigue. I shall call this friend Eubathes. I will say nothing of the progress of our journey through France and Germany; I shall dwell only upon that part of it which has still a strong interest for me, and where events occurred, that I shall never forget. We passed into the Alpine country of Austria, by Lintz, on the Danube, and followed the course of the Traun to Gmünden, on the Traun See, or lake of the Traun, where we halted for some days. If I were disposed to indulge in minute picturesque descriptions, I might occupy hours with details of the various characters of the enchanting scenery in this

neighbourhood. The vales have that pastoral beauty and constant verdure, which is so familiar to us in England, with similar enclosures and hedge-rows, and fruit and forest trees. Above are noble hills planted with beeches and oaks; mountains bound the view, here covered with pines and larches, there raising their marble crests, capped with eternal snows, above the clouds. The lower part of the Traun See is always, even in the most rainy season, perfectly pellucid: and the Traun pours out of it, over ledges of rocks, a large and magnificent river, beautifully clear, and of the purest tint of the beryl. The fall of the Traun, about ten miles below Gmünden, was one of our favourite haunts. It is a cataract, which, when the river is full, may be almost compared to that of Schaffhausen for magnitude, and possesses the same peculiar characters of grandeur, in the precipitous rush of its awful and overpowering waters, and of beauty in the tints of its streams and foam, and in the forms of the rocks over which it falls, and the cliffs and woods by which it is overhung. In this spot an accident, which had nearly been fatal to me, occasioned the renewal of my acquaintance in an extraordinary manner with the mysterious unknown stranger. Eubathes, who was very fond of fly-fishing, was amusing himself by catching graylings for our dinner, in the stream above the fall. I took one of the boats, which are used for descending the canal or lock, artificially cut in the rock by the side of the fall, on which salt and wood are usually transported from Upper Austria to the Danube; and I desired two of the peasants to assist my servant in permitting the boat to descend by a rope to the level of the river below. My intention was to amuse myself by this rapid species of locomotion along the descending sluice. For

some moments the boat glided gently along the smooth current, and I enjoyed the beauty of the moving scene around me, and had my eye fixed upon the bright rainbow seen upon the spray of the cataract above my head; when I was suddenly roused by a shout of alarm from my servant, and, looking round, I saw that the piece of wood to which the rope had been attached had given way, and the boat was floating down the river at the mercy of the stream. I was not at first alarmed, for I saw that my assistants were procuring long poles with which it appeared easy to arrest the boat before it entered the rapidly-descending water of the sluice, and I called out to them to use their united force to reach the longest pole across the water, that I might be able to catch the end of it in my hand. And at this moment I felt perfect security; but a breeze of wind suddenly came down the valley, and blew from the nearest bank, the boat was turned by it out of the side current, and thrown nearer to the middle of the river, and I soon saw that I was likely to be precipitated over the cataract. My servant and the boatmen rushed into the water, but it was too deep to enable them to reach the boat; I was soon in the white water of the descending stream and my danger was inevitable. I had presence of mind enough to consider, whether my chance of safety would be greater by throwing myself out of the boat, or by remaining in it, and I preferred the latter expedient. I looked from the rainbow upon the bright sun above my head, as if taking leave for ever of that glorious luminary; I raised one pious aspiration to the divine source of light and life; I was immediately stunned by the thunder of the fall and my eyes were closed in darkness. How long I remained insensible I know not. My first recollections after this accident

were of a bright light shining above me, of warmth and pressure in different parts of my body and of the noise of the rushing cataract sounding in my ears. I seemed awakened by the light from a sound sleep, and endeavoured to recall my scattered thoughts, but in vain, I soon fell again into slumber. From this second sleep, I was awakened by a voice which seemed not altogether unknown to me, and looking upwards, I saw the bright eye and noble countenance of the Unknown Stranger whom I had met at Pæstum. I faintly articulated "I am in another world." "No," said the stranger, "you are safe in this; you are a little bruised by your fall, but you will soon be well; be tranquil and compose yourself. Your friend is here, and you will want no other assistance than he can easily give you." He then took one of my hands, and I recognised the same strong and warm pressure which I had felt from his parting salute at Pæstum. Eubathes, whom I now saw with an expression of joy and of warmth unusual to him, gave a hearty shake to the other hand: and they both said; "You must repose a few hours longer." After a sound sleep till the evening, I was able to take some refreshment, and found little inconvenience from the accident, except some bruises on the lower part of the body and a slight swimming in the head. The next day, I was able to return to Gmünden, where I learned from the Unknown the history of my escape, which seemed almost miraculous to me. He said he was often in the habit of combining pursuits of natural history with the amusements derived from rural sports, and was fishing the day that my accident happened, below the fall of the Traun, for that peculiar species of the large *salmo* of the Danube which fortunately for me is only to be caught by very strong tackle. He saw, to his very great astonishment

and alarm, the boat and my body precipitated by the fall: and was so fortunate as to entangle his hooks in a part of my dress when I had been scarcely more than a minute under water, and by the assistance of his servant, who was armed with the gaff or curved hook for landing large fish, I was safely conveyed to the shore, undressed, put into a warm bed, and by the modes of restoring suspended animation, which were familiar to him, I soon recovered my sensibility and consciousness. I was desirous of reasoning with him and Eubathes upon the state of annihilation of power and transient death which I had suffered when in the water, but they both requested me to defer those inquiries which required too profound an exertion of thought, till the effects of the shock on my weak constitution were over, and my strength was somewhat re-established; and, I was the more contented to comply with their request, as the Unknown said, it was his intention to be our companion for at least some days longer, and that his objects of pursuit lay in the very country in which we were making our summer tour. It was some weeks before I was sufficiently strong to proceed on our journey, for my frame was little fitted to bear such a trial as that which it had experienced; and considering the weak state of my body when I was immersed in the water, I could hardly avoid regarding my recovery as providential, and the presence and assistance of the Stranger as in some way connected with the future destiny and utility of my life. In the middle of August we pursued our plans of travel. We first visited those romantic lakes—Hallsstadt, Aussee, and Töplitz See, which collect the melted snows of the higher mountains of Styria, to supply the unfailing sources of the Traun. We visited that elevated region of the Tyrol, which forms the crest of

the Pusterthal, and where the same chains of glaciers send down streams to the Drave and the Adige, to the Black Sea, and to the Adriatic. We remained for many days in those two magnificent valleys which afford the sources of the Save, where that glorious and abundant river rises, as it were, in the very bosom of beauty, leaping from its subterraneous reservoirs in the snowy mountains of Terglou and Manhardt, in thundering cataracts amongst cliffs and woods, into the pure and deep cerulean lakes of Wochain and Wurzen, and pursuing its course amidst pastoral meadows, so ornamented with plants and trees, as to look the garden of nature. The subsoil or strata of this part of Illyria are entirely calcareous, and full of subterranean caverns, so that in every declivity large funnel shaped cavities, like the craters of volcanos, may be seen, in which the waters that fall from the atmosphere are lost; and almost every lake or river has a subterraneous source, and often a subterraneous exit. The Laibach river rises twice from the limestone rock, and is twice again swallowed up by the earth before it makes its final appearance, and is lost in the Save. The Zirknitz See or lake is a mass of water entirely filled and emptied by subterraneous sources; and its natural history, though singular, has in it nothing of either prodigy, mystery, or wonder. The grotto of the Maddalena at Adelsberg occupied more of our attention than the Zirknitz See. I shall give the conversation that took place in that extraordinary cavern, entire, as well as I can remember it, in the words used by my companions.

EUB.—We must be many hundred feet below the surface: yet the temperature of this cavern is fresh and agreeable.

THE UNKNOWN.—This cavern has the mean tempe-

rature of the atmosphere, which is the case with all subterraneous cavities removed from the influence of the solar light and heat: and, in so hot a day in August as this, I know no more agreeable or salutary manner of taking a cold bath than in descending to a part of the atmosphere out of the influence of those causes which occasion its elevated temperature.

EUB.—Have you, Sir, been in this country before?

THE UNKNOWN.—This is the third summer that I have made it the scene of an annual visit. Independently of the natural beauties found in Illyria, and the various sources of amusement which a traveller, fond of natural history, may find in this region, it has had a peculiar object of interest for me in the extraordinary animals which are found in the bottom of its subterraneous cavities; I allude to the *Proteus anguinus*,—a far greater wonder of nature than any of those which the Baron Valvasa detailed to the Royal Society, a century and half ago, as belonging to Carniola, with far too romantic an air for a philosopher.

PHIL.—I have seen these animals, in passing through this country before; but I should be very glad to be better acquainted with their natural history.

THE UNKNOWN.—We shall soon be in that part of the grotto where they are found; and I shall willingly communicate the little that I have been able to learn respecting their natural characters and habits.

EUB.—The grotto now becomes really magnificent; I have seen no subterraneous cavity with so many traits of beauty and of grandeur. The irregularity of its surface, the magnitude of the masses broken in pieces, which compose its sides, and which seem torn from the bosom of the mountain by some great convulsion of nature, their dark colours and deep shades, form a singular

contrast with the beauty, uniformity, I may say, order and grace of the white stalactical concretions which hang from the canopy above, and where the light of our torches reflected from the brilliant or transparent calcareous gems, create a scene which almost looks like one produced by enchantment.

PHIL.—If the awful chasms of dark masses of rock surrounding us, appear like the work of demons, who might be imagined to have risen from the centre of the earth, the beautiful works of nature above our heads may be compared to a scenic representation of a temple or banquet hall for fairies or genii, such as those fabled in the Arabian romances.

THE UNKNOWN.—A poet might certainly place here the palace of the king of the Gnomes, and might find marks of his creative power in the small lake close by, on which the flame of the torch is now falling; for, there it is that I expect to find the extraordinary animals which have been so long the objects of my attention.

EUB.—I see three or four creatures, like slender fish, moving on the mud below the water.

THE UNKNOWN.—I see them; they are the Protei; now I have them in my fishing net, and now they are safe in the pitcher of water. At first view, you might suppose this animal to be a lizard, but it has the motions of a fish. Its head, and the lower part of its body and its tail, bear a strong resemblance to those of the eel; but it has no fins; and its curious branchial organs are not like the gills of fishes; they form a singular vascular structure, as you see, almost like a crest, round the throat, which may be removed without occasioning the death of the animal, who is likewise furnished with lungs. With this double apparatus for supplying air to the blood, it can live either below or above the surface of the

water. Its fore feet resemble hands, but they have only three claws or fingers, and are too feeble to be of use in grasping^m or supporting the weight of the animal; the hinder feet have only two claws or toes, and in the larger specimens are found so imperfect as to be almost obliterated. It has small points in place of eyes, as if to preserve the analogy of nature. It is of a fleshy whiteness and transparency in its natural state, but when exposed to light, its skin gradually becomes darker, and at last gains an olive tint. Its nasal organs appear large; and it is abundantly furnished with teeth, from which it may be concluded, that it is an animal of prey, yet, in its confined state, it has never been known to eat, and it has been kept alive for many years, by occasionally changing the water in which it was placed.

EUB.—Is this the only place in Carniola where these animals are found?

THE UNKNOWN.—They were first discovered here by the late Baron Zoïs; but they have since been found, though rarely, at Sittich, about thirty miles distant, thrown up by water from a subterraneous cavity; and I have lately heard it reported that some individuals of the same species have been recognized in the calcareous strata in Sicily.

EUB.—This lake in which we have seen these animals is a very small one; do you suppose they are bred here?

THE UNKNOWN.—Certainly not; in dry seasons they are seldom found here, but after great rains they are often abundant. I think it cannot be doubted, that their natural residence is in an extensive deep subterranean lake, from which in great floods they sometimes are forced through the crevices of the rocks into this place where they are found; and, it does not appear to

me impossible, when the peculiar nature of the country in which we are is considered, that the same great cavity may furnish the individuals which have been found at Adelsburg and at Sittich.

EUB.—This is a very extraordinary view of the subject. Is it not possible that it may be the larva of some large unknown animal inhabiting these limestone cavities? Its feet are not in harmony with the rest of its organization, and were they removed, it would have all the characters of a fish.

THE UNKNOWN.—I cannot suppose that they are larvæ. There is I believe in nature no instance of a transition by this species of metamorphosis, from a more perfect to a less perfect animal. The tadpole has a resemblance to a fish before it becomes a frog; the caterpillar and the maggot gain not only more perfect powers of motion on the earth in their new state, but acquire organs by which they inhabit a new element. This animal, I dare say, is much larger than we now see it, when mature in its native place; but its comparative anatomy is exceedingly hostile to the idea that it is an animal in a state of transition. It has been found of various sizes, from that of the thickness of a quill to that of the thumb, but its form of organs has been always the same. It is surely a perfect animal of a peculiar species. And it adds one instance more to the number already known of the wonderful manner in which life is produced and perpetuated in every part of our globe, even in places which seem the least suited to organized existences.—And the same infinite power and wisdom which has fitted the camel and the ostrich for the deserts of Africa, the swallow that secretes its own nest for the caves of Java, the whale for the Polar seas, and the morse and white bear for the Arctic ice, has

given the Proteus to the deep and dark subterraneous lakes of Illyria,—an animal to whom the presence of light is not essential, and who can live indifferently in air and in water, on the surface of the rock, or in the depths of the mud.

PHIL.—It is now ten years since I first visited this spot. I was exceedingly anxious to see the Proteus, and came here with the guide in the evening of the day I arrived at Adelsberg; but though we examined the bottom of the cave with the greatest care, we could find no specimens. We returned the next morning and were more fortunate, for we discovered five close to the bank on the mud covering the bottom of the lake; the mud was smooth and perfectly undisturbed, and the water quite clear. This fact of their appearance during the night, seemed to me so extraordinary, that I could hardly avoid the fancy that they were new creations. I saw no cavities through which they could have entered, and the undisturbed state of the lake seemed to give weight to my notion. My reveries became discursive, I was carried in imagination back to the primitive state of the globe, when the great animals of the sauri kind were created under the pressure of a heavy atmosphere; and my notion on this subject was not destroyed, when I heard from a celebrated anatomist, to whom I sent the specimens I had collected, that the organization of the spine of the Proteus was analogous to that of one of the sauri, the remains of which are found in the older secondary strata. It was said at this time that no organs of reproduction had been discovered in any of the specimens examined by physiologists, and this lent a weight to my opinion of the possibility of their being actually new creations, which I suppose you will condemn as wholly visionary and unphilosophical.

EUB.—From the tone in which you make your statements, I think you yourself consider them as unworthy of discussion. On such ground, eels might be considered new creations, for their mature ovaria have not yet been discovered, and they come from the sea into rivers under circumstances when it is difficult to trace their course.

THE UNKNOWN.—The problem of the reproduction of the Proteus, like that of the common eel, is not yet solved; but ovaria have been discovered in animals of both species, and in this instance, as in all others belonging to the existing order of things, Harvey's maxim of "*omne vivum ab ovo*" will apply.

EUB.—You just now said, that this animal has been long an object of attention to you; have you studied it as a comparative anatomist, in search of the solution of the problem of its reproduction?

THE UNKNOWN.—No; this inquiry has been pursued by much abler investigators, by Schreiber and Configliachi; my researches were made upon its respiration and the changes occasioned in water by its branchiæ.

EUB.—I hope they have been satisfactory.

THE UNKNOWN.—They proved to me at least, that not merely the oxygen dissolved in water, but likewise a part of the azote was absorbed in the respiration of this animal.

EUB.—So that your researches confirm those of the French savans and Alexander von Humboldt, that in the respiration of animals which separate air from water both principles of the atmosphere are absorbed.

PHIL.—I have heard so many and such various opinions on the nature of the function of respiration, during my education, and since, that I should like to know what is the modern doctrine on this subject: I

can hardly refer to better authority than yourself, and I have an additional reason for wishing for some accurate knowledge on this matter, having, as you well know, been the subject of an experiment in relation to it, which, but for your kind and active assistance, must have terminated fatally.

THE UNKNOWN.—I shall gladly state what I know, which is very little. In physics and in chemistry, the science of dead matter, we possess many facts and a few principles or laws, but whenever the functions of life are considered, though the facts are numerous, yet there is, as yet, scarcely any approach to general laws; and we must usually end where we begin, by confessing our entire ignorance.

EUB.—I will not allow this ignorance to be entire; something, undoubtedly, has been gained by the knowledge of the circulation of the blood and its aëration in the lungs,—these, if not laws, are at least fundamental principles.

THE UNKNOWN.—I speak only of the functions in their connexion with life. We are still ignorant of the source of animal heat, though half a century ago the chemists thought they had proved it was owing to a sort of combustion of the carbon of the blood.

PHIL.—As we return to our inn, I hope you will both be so good as to give me your views of the nature of this function, so important to all living beings; tell me what you *know*, or what you *believe*, or what others *imagine they know*.

THE UNKNOWN.—The powers of the organic system depend upon a continued state of change; the waste of the body produced in muscular action, perspiration, and various secretions, is made up for by the constant supply of nutritive matter to the blood by the absorbents; and by

the action of the heart the blood is preserved in perpetual motion through every part of the body. In the lungs, or bronchia, the venous blood is exposed to the influence of air, and undergoes a remarkable change, being converted into arterial blood. The obvious chemical alteration of the air is sufficiently simple in this process; a certain quantity of carbon only is added to it, and it receives an addition of heat or vapour; the volumes of elastic fluid inspired and expired (making allowance for change of temperature) are the same, and if ponderable agents only were to be regarded, it would appear as if the only use of respiration were to free the blood from a certain quantity of carbonaceous matter. But it is probable that this is only a secondary object, and that the change produced by respiration upon the blood is of a much more important kind, Oxygen, in its elastic state, has properties which are very characteristic; it gives out light by compression, which is not certainly known to be the case with any other elastic fluid except those with which oxygen has entered without undergoing combustion; and from the fire it produces in certain processes, and from the manner in which it is separated by positive electricity in the gaseous state from its combinations, it is not easy to avoid the supposition, that it contains besides its ponderable elements, some very subtile matter which is capable of assuming the form of heat and light. *My idea* is, that the common air inspired enters into the venous blood entire, in a state of dissolution, carrying with it its subtile or ethereal part, which in ordinary cases of chemical change is given off; that it expels from the blood carbonic acid gas and azote; and that, in the course of the circulation, its ethereal part and its ponderable part undergo changes which belong to laws

that cannot be considered as chemical,—the ethereal part probably producing animal heat and other effects, and the ponderable part contributing to form carbonic acid and other products. The arterial blood is necessary to all the functions of life, and it is no less connected with the irritability of the muscles and the sensibility of the nerves than with the performance of all the secretions.

EUB.—No one can be more convinced than I am of the very limited extent of our knowledge in chemical physiology; and, when I say, that having been a disciple and friend of Dr. Black, I am still disposed to prefer his ancient view to your new one, I wish merely to induce you to pause and to hear my reasons; they may appear insufficient to you, but I am anxious to explain them. First, then, in all known chemical changes in which oxygen gas is absorbed and carbonic acid gas formed, heat is produced; I could mention a thousand instances, from the combustion of wood or spirits of wine, to the fermentation of fruit, or the putrefaction of animal matter. This general fact, which may be almost called a law, is in favour of the view of Dr. Black. Another circumstance in favour of it is, that those animals which possess the highest temperature consume the greatest quantity of air; and, under different circumstances of action and repose, the heat is in great measure proportional to the quantity of oxygen consumed. Then, those animals which absorb the smallest quantity of air are cold blooded. Another argument in favour of Dr. Black's opinion is, the change of colour of blood from black to red; which seems to show that it loses carbon.

THE UNKNOWN.—With the highest respect for the memory of Dr. Black, and for the opinion of his disciple, I shall answer the arguments I have just heard. I

will not allow any facts or laws from the action of dead matter to apply to living structures; the blood is a living fluid, and of this we are sure, that it does not burn in respiration. The terms warmth and cold, as applied to the blood of animals, are improper in the sense in which they have been just used; all animals are in fact warm-blooded, and the degrees of their temperature are fitted to the circumstances under which they live, and those animals the life of which is most active, possess most heat, which may be the result of general actions, and not a particular effect of respiration. Besides, a distinguished physiologist has rendered it probable, that the animal heat depends more upon the functions of the nerves than upon any result of respiration. The argument, derived from change of colour is perfectly delusive; it would not follow, if carbon were liberated from the blood, that it must necessarily become brighter; sulphur combining with charcoal becomes a clear fluid, and a black oxide of copper becomes red in uniting with a substance which abounds in carbon. No change in sensible qualities can ever indicate with precision the nature of chemical change.

I shall resume my view, which I cannot be said to have fully developed. When I stated that carbonic acid was formed in the venous blood in the processes of life, I meant merely to say that this blood, in consequence of certain changes, became capable of giving off carbon and oxygen in union with each other, for the moment inorganic matter enters into the composition of living organs it obeys new laws. The action of the gastric juice is chemical and it will only dissolve dead matters, and it dissolves them when they are in tubes of metal as well as in the stomach, but it has no action upon living matter. Respiration is no more a chemical pro-

cess than the absorption of chyle ; and the changes that take place in the lungs though they appear so simple may be very complicated ; it is as little philosophical to consider them as a mere combustion of carbon, as to consider the formation of muscle from the arterial blood as crystallization. There can be no doubt that all the powers and agencies of matter are employed in the purposes of organization, but the phenomena of organization can no more be referred to chemistry than those of chemistry to mechanics. As oxygen stands in that electrical relation to the other elements of animal matter which has been called electro-positive, it may be supposed, that some electrical function is exercised by oxygen in the blood ; but this is a mere hypothesis. An attempt has been made founded on experiments on the decomposition of bodies by electricity to explain secretion by weak electrical powers, and to suppose the glands electrical organs, and even to imagine the action of the nerves dependent upon electricity ; these, like all other notions of the same kind, appear to me very little refined. If electrical effects be the exhibition of certain powers belonging to matter, which is a fair supposition, then no change can take place without their being more or less concerned ; but, to imagine the presence of electricity to solve phenomena, the cause of which is unknown, is merely to substitute one undefined word for another. In some animals electrical organs are found, but, then, they furnish the artillery of the animal and means of seizing its prey and of its defence. And speculations of this kind must be ranked with those belonging to some of the more superficial followers of the Newtonian philosophy, who explained the properties of animated nature by mechanical powers, and muscular action by the expansion and contraction of elastic

bladders; man, in this state of vague philosophical inquiry, was supposed a species of hydraulic machine. And when the pneumatic chemistry was invented, organic structures were soon imagined to be laboratories in which combinations and decompositions produced all the effects of living actions; then muscular contractions were supposed to depend upon explosions like those of the detonating compounds, and the formation of blood from chyle was considered as a pure chemical solution. And, now that the progress of science has opened new and extraordinary views in electricity, these views are not unnaturally applied by speculative reasoners to solve some of the mysterious and recondite phenomena of organized beings. But the analogy is too remote and incorrect; the sources of life cannot be grasped by such machinery; to look for them in the powers of electro-chemistry is seeking the living among the dead; — that which touches, will not be felt, that which sees will not be visible, that which commands sensations will not be their subject.

PHIL.—I conclude from what you last said, that though you are inclined to believe that some unknown subtile matter is added to the organized system by respiration, yet you would not have us believe, that this is electricity, or that there is any reason to suppose that electricity has a peculiar and special share in producing the functions of life.

THE UNKNOWN.—I wish to guard you against the adoption of any hypothesis on this recondite and abstruse subject. But however difficult it may be to define the exact nature of respiration, yet the effect of it and its connexions with the functions of the body are sufficiently striking. By the action of air on the blood it is fitted for the purposes of life, and from the moment

that animation is marked by sensation or volition this function is performed, the punctum saliens in the ovum seems to receive as it were the breath of life in the influence of air. In the economy of the reproduction of the species of animals, one of the most important circumstances is the aëration of the ovum, and when this is not performed from the blood of the mother as in the mammalia by the placenta, there is a system for aërating as in the oviparous reptiles or fishes, which enables the air freely to pass through the receptacles in which the eggs are deposited, or the egg itself is aërated out of the body through its coats or shell, and when air is excluded, incubation or artificial heat has no effect. Fishes, which deposit their eggs in water that contains only a limited portion of air, make combinations which would seem almost the result of scientific knowledge or reason, though depending upon a more unerring principle, their instinct for preserving their offspring. Those fishes that spawn in spring or the beginning of summer and which inhabit deep and still waters, as the carp, bream, pike, tench, &c. deposit their eggs upon aquatic vegetables, which by the influence of the solar light constantly preserve the water in a state of aëration. The trout, salmon, hucho and others of the salmo genus, which spawn in the beginning or end of winter and which inhabit rivers fed by cold and rapid streams which descend from the mountains, deposit their eggs in shallows on heaps of gravel, as near as possible to the source of the stream where the water is fully combined with air; and, to accomplish this purpose they travel for hundreds of miles against the current and leap over cataracts and dams,—thus the salmo salar ascends by the Rhone and the Aar to the glaciers of Switzerland, the hucho by the Danube, the Isar and the Save passing through the

lakes of the Tyrol and Styria to the highest torrents of the Noric and Julian Alps.

PHIL.—My own experience proves in the strongest manner the immediate connexion of sensibility with respiration; all that I can remember in my accident was a certain violent and painful sensation of oppression in the chest which must have been immediately succeeded by loss of sense.

EUB.—I have no doubt that all your suffering was over at the moment you describe; as far as sensibility is concerned you were inanimate when your friend raised you from the bottom. This distinct connexion of sensibility with the absorption of air by the blood, is I think in favour of the idea advanced by our friend, that some subtile and etherial matter is supplied to the system in the elastic air which may be the cause of vitality.

THE UNKNOWN.—Softly, if you please; I must not allow you to mistake my view. I think it probable that some subtile matter is derived from the atmosphere connected with the functions of life; but nothing can be more remote from my opinion than to suppose it the cause of vitality.

PHIL.—This might have been fully inferred from the whole tenor of your conversation, and particularly from that expression “that which commands sensation will not be their subject;” I think I shall not mistake your views when I say, that you do not consider vitality dependent upon any material cause or principle.

THE UNKNOWN.—You do not: we are entirely ignorant on this subject; and, I confess in the utmost humility, my ignorance. I know there have been distinguished physiologists who have imagined that by organization, powers not naturally possessed by matter

were developed, and that sensibility was a property belonging to some unknown combination of unknown ethereal elements. But such notions appear to me unphilosophical, and the mere substitution of unknown words for unknown things. I can never believe that any division, or refinement, or subtilization, or juxtaposition, or arrangement of the particles of matter can give to them sensibility; or, that *intelligence* can result from combinations of insensate and brute atoms. I can as easily imagine that the planets are moving by their will or design round the sun, or that a cannon-ball is reasoning in making its parabolic curve. The materialists have quoted a passage of Locke in favour of their doctrine, who seemed to doubt, "whether it might not have pleased God to bestow a power of thinking on matter." But with the highest veneration for this great reasoner, the founder of modern philosophical logic, I think there is little of his usual strength of mind in this doubt. It appears to me that he might as well have asked, whether it might not have pleased God to make a house its own tenant.

EUB.—I am not a professed materialist; but I think you treat rather too lightly the modest doubts of Locke on this subject. And without considering me as a partizan, you will, I hope, allow me to state some of the reasons which I have heard good physiologists advance in favour of that opinion to which you are so hostile. In the first accretion of the parts of animated beings, they appear almost like the crystallized matter, with the simplest kind of life, scarcely sensitive. The gradual operations by which they acquire new organs and new powers, corresponding to these organs, till they arrive at full maturity, forcibly strike the mind with the idea that the powers of life reside in the arrangement by

which the organs are produced. Then, as there is a gradual increase of power corresponding to the increase of perfection of the organization, so there is a gradual diminution of it connected with the decay of the body. As the imbecility of infancy corresponds to the weakness of organization, so the energy of youth, and the power of manhood, are marked by its strength; and, the feebleness and dotage of old age are in the direct ratio of the decline of the perfection of the organization; and, the mental powers in extreme old age seem destroyed at the same time with the corporeal ones, till the ultimate dissolution of the frame, when the elements are again restored to that dead nature from which they were originally derived. Then, there was a period, when the greatest philosopher, statesman, or hero, that ever existed, was a mere living atom, an organized form, with the sole power of perception; and the combinations that a Newton formed before birth, or immediately after, cannot be imagined to have possessed the slightest intellectual character. If a peculiar principle be supposed necessary to intelligence, it must exist throughout animated nature. The elephant approaches nearer to man in intellectual power than the oyster does to the elephant; and a link of sensitive nature may be traced from the polypus to the philosopher. Now, in the polypus the sentient principle is divisible, and from one polypus or one earthworm may be formed two or three, all of which become perfect animals, and have perception and volition; therefore, at least, the sentient principle has this property in common with matter, that it is divisible. Then, to these difficulties, add the dependence of all the higher faculties of the mind upon the state of the brain; remember, that not only all the intellectual powers, but even sensibility, is destroyed by

the pressure of a little blood upon the cerebellum, and the difficulties increase. Call to mind, likewise, the suspension of animation in cases similar to that of our friend, when there are no signs of life, and when animation returns only with the return of organic action. Surely, in all these instances, every thing which you consider as belonging to spirit appears in intimate dependence upon the arrangements and properties of matter.

THE UNKNOWN.—The arguments you have used, are those which are generally employed by physiologists. They have weight in appearance, but not in reality; they prove that a certain perfection of the machinery of the body is essential to the exercise of the powers of the mind, —but, they do not prove that the machine is the mind. Without the eye there can be no sensations of vision, and without the brain there could be no recollected visible ideas; but neither the optic nerve nor the brain can be considered as the percipient principle, they are but the instruments of a power which has nothing in common with them. What may be said of the nervous system may be applied to a different part of the frame; stop the motion of the heart, and sensibility and life cease, yet the living principle is not in the heart, nor in the arterial blood, which it sends to every part of the system. A savage, who saw the operation of a number of power-looms weaving stockings cease at once on the stopping of the motion of a wheel, might well imagine that the motive force was in the wheel; he could not divine that it more immediately depended upon the steam, and ultimately upon a fire below a concealed boiler. The philosopher sees the fire which is the cause of the motion of this complicated machinery, so unintelligible to the savage; but both are equally ignorant of the *divine fire*

which is the cause of the mechanism of organized structures. Profoundly ignorant on this subject, all that we can do is to give a history of our own minds. The external world, or matter, is to us in fact nothing but a heap or cluster of sensations, and in looking back to the memory of our own being, we find one principle which may be called the *monad*, or *self*, constantly present, intimately associated with a particular class of sensations, which we call our own body or organs. These organs are connected with other sensations, and move, as it were, with them in circles of existence, quitting, for a time, some trains of sensation to return to others, but the monad is always present; we can fix no beginning to its operations, we can place no limit to them. We sometimes, in sleep, lose the beginning and end of a dream, and recollect the middle of it, and one dream has no connexion with another, and yet we are conscious of an infinite variety of dreams, and there is a strong analogy for believing in an infinity of past existences, which must have had connexion; and human life may be regarded as a type of infinite and immortal life, and its succession of sleep and dreams as a type of the changes of death and birth, to which, from its nature, it is liable. That the ideas belonging to the mind were originally gained from those classes of sensations called organs, it is impossible to deny, as it is impossible to deny that mathematical truths depend upon the signs which express them; but these signs are not themselves the truths, nor are the organs the mind. The whole history of intellect is a history of change, according to a certain law; and we retain the memory only of those changes which may be useful to us;—the child forgets what happened to it in the womb; the recollections of the infant, likewise, before two years, are soon lost; yet, many of

the habits acquired in that age are retained through life. The sentient principle gains thoughts by material instruments; and, its sensations change as those instruments change; and, in old age, the mind, as it were, falls asleep to awake to a new existence. With its present organization, the intellect of man is naturally limited and imperfect; but, this depends upon its material machinery; and in a higher organized form, it may be imagined to possess infinitely higher powers. Were man to be immortal in his present corporeal frame, this immortality would only belong to the machinery: and with respect to acquisitions of mind, he would virtually die every two or three hundred years,—that is to say, a certain quantity of ideas only could be remembered, and the supposed immortal being would be, with respect to what had happened a thousand years ago, as the adult now is with respect to what happened in the first year of his life. To attempt to reason upon the manner in which the organs are connected with sensation would be useless; the nerves and brain have some immediate relation to these vital functions, but how they act, it is impossible to say. From the rapidity and infinite variety of the phenomena of perception, it seems extremely probable that there must be in the brain and nerves matter of a nature far more subtile and refined than any thing discovered in them by observation and experiment, and that the immediate connexion between the sentient principle and the body may be established by kinds of ethereal matter, which can never be evident to the senses, and which may bear the same relations to heat, light, and electricity, that these refined forms or modes of existence of matter bear to the gasses. Motion is most easily produced by the lighter species of matter; and yet imponderable agents, such as electricity, possess

force sufficient to overturn the weightiest structures. Nothing can be farther from my meaning than to attempt any definition on this subject, nor would I ever embrace or give authority to that idea of Newton, who supposes that the immediate cause of sensation may be in undulations of an ethereal medium. It does not, however, appear improbable to me, that some of the more refined machinery of thought may adhere, even in another state, to the sentient principle; for, though the organs of gross sensation, the nerves and brain, are destroyed by death, yet something of the more ethereal nature, which I have supposed, may be less destructible. And, I sometimes imagine, that many of those powers, which have been called instinctive, belong to the more refined clothing of the spirit; conscience, indeed, seems to have some undefined source, and may bear relation to a former state of being.

EUB.—All your notions are merely ingenious speculations. Revelation gives no authority to your ideas of spiritual nature; the Christian immortality is founded upon the resurrection of the body.

THE UNKNOWN.—This I will not allow. Even in the Mosaic history of the creation of man, his frame is made in the image of God, that is, capable of intelligence; and the Creator breathes into it the breath of life, his own essence. Then our Saviour has said, “of the God of Abraham, of Isaac, and of Jacob.” “He is not the God of the dead, but of the living.” St. Paul has described the clothing of the spirit in a new and glorious body, taking the analogy from the living germ in the seed of the plant, which is not quickened till after apparent death; and the catastrophe of our planet, which, it is revealed, is to be destroyed and purified by fire, before it is fitted for the habitation of the blest, is in

perfect harmony with the view I have ventured to suggest.

EUB.—I cannot make your notions coincide with what I have been accustomed to consider the meaning of holy writ. You allow every thing belonging to the material life to be dependent upon the organization of the body, and yet you imagine the spirit after death clothed with a new body ; and, in the system of rewards and punishments, this body is rendered happy or miserable for actions committed by another and extinct frame. A particular organization may impel to improper and immoral gratification ; it does not appear to me, according to the principles of eternal justice, that the body of the resurrection should be punished for crimes dependent upon a conformation now dissolved and destroyed.

THE UNKNOWN.—Nothing is more absurd, I may say more impious, than for man, with a ken surrounded by the dense mists of sense, to *reason* respecting the decrees of eternal justice. You adopt here the same limited view that you embraced in reasoning against the indestructibility of the sentient principle in man, from the apparent division of the living principle in the polypus, not recollecting that to prove a quality can be increased or exalted, does not prove that it can be annihilated. If there be, which I think cannot be doubted, a consciousness of good and evil constantly belonging to the sentient principle in man, then rewards and punishments naturally belong to acts of this consciousness, to obedience or disobedience ; and, the indestructibility of the sentient being is necessary to the decrees of eternal justice. On your view, even in *this life*, *just* punishments for crimes would be almost impossible ; for the materials of which human beings are composed change rapidly, and in a few years probably not an atom of the

primitive structure remains; yet even the materialist is obliged, in old age, to do penance for the sins of his youth, and does not complain of the injustice of his decrepit body, entirely changed and made stiff by time, suffering for the intemperance of his youthful flexible frame. On my idea, conscience is the frame of the mind, fitted for its probation in mortality. And this is in exact accordance with the foundations of our religion, the divine origin of which is marked no less by its history than its harmony with the principles of our nature. Obedience to its precepts, not only prepares for a better state of existence in another world, but is likewise calculated to make us happy here. We are constantly taught to renounce sensual pleasure and selfish gratifications, to forget our body and sensible organs, to associate our pleasures with mind, to fix our affections upon the great ideal generalization of intelligence in the one Supreme Being. And, that we are capable of forming to ourselves an imperfect idea even of the infinite mind, is, I think, a strong presumption of our own immortality, and of the distinct relation which our finite knowledge bears to eternal wisdom.

PHIL.—I am pleased with your views; they coincide with those I had formed at the time my imagination was employed upon the vision of the Colosseum, which I repeated to you, and are not in opposition with the opinions that the cool judgment and sound and humble faith of Ambrosio have led me since to embrace. The doctrine of the *materialists* was always, even in my youth, a cold, heavy, dull and insupportable doctrine to me, and necessarily tending to atheism. When I had heard with disgust, in the dissecting rooms, the plan of the physiologist, of the gradual accretion of matter and its becoming endowed with irritability, ripening into

sensibility and acquiring such organs as were necessary, by its own inherent forces, and at last rising into intellectual existence, a walk into the green fields or woods by the banks of rivers brought back my feelings from nature to God; I saw in all the powers of matter the instruments of the deity; the sunbeams, the breath of the zephyr awakening animation in forms prepared by divine intelligence to receive it; the insensate seed, the slumbering egg, which were to be vivified, appeared like the new born animal, works of a divine mind; I saw *love* as the creative principle in the material world, and this love only as a divine attribute. Then, my own mind I felt connected with new sensations and indefinite hopes, a thirst for immortality; the great names of other ages and of distant nations appeared to me to be still living around me; and, even in the funeral monuments of the heroic and the great, I saw, as it were, the decree of the indestructibility of mind. These feelings, though generally considered as poetical, yet, I think, offer a sound philosophical argument in favour of the immortality of the soul. In all the habits and instincts of young animals, their feelings or movements may be traced in intimate relation to their improved perfect state; their sports have always affinities to their modes of hunting or catching their food, and young birds even in the nest show marks of fondness, which when their frames are developed become signs of actions necessary to the reproduction and preservation of the species. The desire of glory, of honour, of immortal fame and of constant knowledge, so usual in young persons of well-constituted minds, cannot, I think, be other than symptoms of the infinite and progressive nature of intellect—hopes, which as they cannot be gratified here,

belong to a frame of mind suited to a nobler state of existence.

THE UNKNOWN.—Religion, whether natural or revealed, has always the same beneficial influence on the mind. In youth, in health and prosperity, it awakens feelings of gratitude and sublime love, and purifies at the same time that it exalts; but it is in misfortune, in sickness, in age, that its effects are most truly and beneficially felt; when submission in faith, and humble trust in the divine will, from duties become pleasures, undecaying sources of consolation; then it creates powers which were believed to be extinct, and gives a freshness to the mind, which was supposed to have passed away for ever, but which is now renovated as an immortal hope; then it is the Pharos, guiding the wave-tost mariner to his home, as the calm and beautiful still basins or fiords surrounded by tranquil groves and pastoral meadows to the Norwegian pilot escaping from a heavy storm in the north sea, or as the green and dewy spot gushing with fountains to the exhausted and thirsty traveller in the midst of the desert. Its influence outlives all earthly enjoyments, and becomes stronger as the organs decay and the frame dissolves; it appears as that evening star of light in the horizon of life, which, we are sure, is to become in another season a morning star, and it throws its radiance through the gloom and shadow of death.

DIALOGUE THE FIFTH.

THE CHEMICAL PHILOSOPHER.

I HAD been made religious by the conversations of Ambrosio in Italy; my faith was strengthened and exalted by the opinions of the Unknown, for whom, I had not merely that veneration awakened by exalted talents, but a strong affection founded upon the essential benefit of the preservation of my life owing to him. I ventured, the evening after our visit to the cave of Adelsberg, to ask him some questions relating to his history and adventures. He said, to attempt to give you any idea of the formation of my character, would lead me into the history of my youth, which almost approaches to a tale of romance. The source of the little information and intelligence I possess, I must refer to a restless activity of spirit, a love of glory which ever belonged to my infancy and a sensibility easily excited and not easily conquered. My parentage was humble; yet I can believe a traditional history of my paternal grandmother, that the origin of our family was from an old Norman stock; I found this belief upon certain feelings which I can only refer to an hereditary source, a pride of decorum, a tact and refinement even in boyhood, and which are contradictory to the idea of an origin from a race of peasants. Accident opened to me in early youth a philosophical career, which I pursued with success. In manhood, fortune smiled upon me and made me independent; I then really became a philosopher, and pursued my travels with the object of instructing myself and of benefiting mankind. I have seen most parts of Europe, and conversed, I believe, with all the illustrious men of

science belonging to them. My life has not been unlike that of the ancient Greek sages. I have added some little to the quantity of human knowledge, and I have endeavoured to add something to the quantity of human happiness. In my early life I was a sceptic; I have informed you how I became a believer; and I constantly bless the Supreme Intelligence for the favour of some gleams of divine light which have been vouchsafed to me in this our state of darkness and doubt.

PHIL.—I am surprised that with your powers you did not enter into a professional career either of law or politics; you would have gained the highest honours and distinctions.

THE UNKNOWN.—To me there never has been a higher source of honour or distinction than that connected with advances in science. I have not possessed enough of the eagle in my character to make a direct flight to the loftiest altitudes in the social world; and I certainly never endeavoured to reach those heights by using the creeping powers of the reptile, who in ascending, generally chooses the dirtiest path, because it is the easiest.

EUB.—I have often wondered that men of fortune and of rank do not apply themselves more to philosophical pursuits; they offer a delightful and enviable road to distinction, one founded upon the blessings and benefits conferred on our fellow creatures; they do not supply the same sources of temporary popularity as successes in the senate or at the bar, but the glory resulting from them is permanent, and independent of vulgar taste or caprice. In looking back to the history of the last five reigns in England, we find Boyles, Cavadishes, and Howards, who rendered these great names more illustrious by their scientific honours; but we

may in vain search the aristocracy now for philosophers, and there are very few persons who pursue science with true dignity; it is followed more as connected with objects of profit than those of fame, and there are fifty persons who take out patents for supposed inventions for one who makes a real discovery.

PHIL.—The information we have already received from you proves to me that chemistry has been your favourite pursuit. I am surprised at this. The higher mathematics and pure physics appear to me to offer much more noble objects of contemplation and fields of discovery; and, practically considered, the results of the chemist are much more humble, belonging principally to the apothecary's shop and the kitchen.

EUB.—I feel disposed to join you in attacking this favourite study of our friend, *but merely* to provoke him to defend it. I wish our attack would induce him to vindicate his science, and that we might enjoy a little of the sport of literary gladiators, at least, in order to call forth his skill and awaken his eloquence.

THE UNKNOWN.—I have no objection. Let there be a fair discussion; remember we fight only with foils, and the point of mine shall be covered with velvet. In your attack upon chemistry, Philalethes, you limited the use of it to the apothecary's shop and the kitchen. The first is an equivocal use; by introducing it into the kitchen you make it an art fundamental to all others. But if what you stated had really meant to be serious, it would not have deserved a reply; as it is in mere playfulness, it shall not be thrown away; I want eloquence, however, to adorn my subject, yet it is sufficiently exciting even to awaken feeling. Persons in general look at the magnificent fabric of civilized society as the result of the accumulated labour, in-

genuity, and enterprise of man through a long course of ages, without attempting to define what has been owing to the different branches of human industry and science; and usually attribute to politicians, statesmen, and warriors, a much greater share than really belongs to them in the work;—what they have done is in reality little. The beginning of civilization is the discovery of some useful arts by which men acquire property, comforts, or luxuries. The necessity or desire of preserving them leads to laws and social institutions. The discovery of peculiar arts gives superiority to particular nations; and the love of power induces them to employ this superiority to subjugate other nations, who learn their arts, and ultimately adopt their manners;—so that in reality the origin, as well as the progress, and improvement of civil society is founded in mechanical and chemical inventions. No people have ever arrived at any degree of perfection in their institutions who have not possessed in a high degree the useful and refined arts. The comparison of savage and civilized man, in fact, demonstrates the triumph of chemical and mechanical philosophy as the causes not only of the physical, but ultimately even of moral improvement. Look at the condition of man in the lowest state in which we are acquainted with him. Take the native of New Holland, advanced only a few steps above the animal creation, and that principally by the use of fire; naked, defending himself against wild beasts or killing them for food only by weapons made of wood hardened in the fire, or pointed with stones or fish bones; living only in holes dug out of the earth, or in huts rudely constructed of a few branches of trees covered with grass; having no approach to the enjoyment of luxuries or

even comforts; unable to provide for his most pressing wants; having a language scarcely articulate, relating only to the great objects of nature, or to his most pressing necessities or desires, and living solitary or in single families; unacquainted with religion, government or laws, submitted to the mercy of nature or the elements. How different is man in his highest state of cultivation! every part of his body covered with the products of different chemical and mechanical arts made not only useful in protecting him from the inclemency of the seasons, but combined in forms of beauty and variety; creating out of the dust of the earth from the clay under his feet instruments of use and ornament; extracting metals from the rude ore and giving to them a hundred different shapes for a thousand different purposes; selecting and improving the vegetable productions with which he covers the earth; not only subduing but taming and domesticating the wildest, the fleetest and the strongest inhabitants of the wood, the mountain and the air; making the winds carry him on every part of the immense ocean; and compelling the elements of air, water, and even fire as it were to labour for him; concentrating in small space materials which act as the thunderbolt and directing their energies so as to destroy at immense distances; blasting the rock, removing the mountain, carrying water from the valley to the hill; perpetuating thought in imperishable words, rendering immortal the exertion of genius and presenting them as common property to all awakening minds,—becoming as it were the true image of divine intelligence receiving and bestowing the breath of life in the influence of civilization.

EUB.—Really you are in the poetical, not the chemical chair, or rather on the tripod. We claim from you some

accuracy of detail, some minute information, some proofs of what you assert. What you attribute to the chemical and mechanical arts, we might with the same propriety attribute to the fine arts, to letters, to political improvement, and to those inventions of which Minerva and Apollo, not Vulcan, are the patrons.

THE UNKNOWN.—I will be more minute. You will allow that the rendering skins insoluble in water by combining with them the astringent principle of certain vegetables is a chemical invention, and that without leather our shoes, our carriages, our equipages would be very ill made; you will permit me to say, that the bleaching and dyeing of wool and silk, cotton and flax are chemical processes, and that the conversion of them into cloth of different kinds is a mechanical invention; that the working of iron, copper, tin and lead and the other metals, and the combining them in different alloys by which almost all the instruments necessary for the turner, the joiner, the stone-mason, the ship-builder and the smith are made, are chemical inventions; even the press, to the influence of which I am disposed to attribute as much as you can do, could not have existed in any state of perfection without a metallic alloy; the combining of alkali and sand, and certain clays and flints together to form glass and porcelain is a chemical process; the colours which the artist employs to frame resemblances of natural objects, or to create combinations more beautiful than ever existed in nature are derived from chemistry; in short, in every branch of the common and fine arts, in every department of human industry, the influence of this science is felt, and we may find in the fable of Prometheus taking the flame from heaven to animate his man of clay an emblem of the effects of fire in its application to chemical purposes

in creating the activity and almost the life of civil society.

PHIL.—It appears to me that you attribute to science what in many cases has been the result of accident. The processes of most of the useful arts, which you call chemical, have been invented and improved without any refined views, without any general system of knowledge. Lucretius attributes to accident the discovery of the fusion of the metals; a person in touching a shell-fish observes that it emits a purple liquid as a dye, hence the Tyrian purple; clay is observed to harden in the fire, and hence the invention of bricks, which could hardly fail ultimately to lead to the discovery of porcelain; even glass, the most perfect and beautiful of those manufactures you call chemical, is said to have been discovered by accident; Theophrastus states, that some merchants who were cooking on some lumps of soda or natron, near the mouth of the river Belus, observed that a hard and vitreous substance was formed where the fused natron ran into the sand.

THE UNKNOWN.—I will readily allow that accident has had much to do with the origin of the arts as with the progress of the sciences. But it has been by scientific processes and experiments that these accidental results have been rendered really applicable to the purposes of common life. Besides, it requires a certain degree of knowledge and scientific combination to understand and seize upon the facts which have originated in accident. It is certain, that in all fires, alkaline substances and sand are fused together and clay hardened; yet for ages after the discovery of fire, glass and porcelain were unknown till some men of genius profited by scientific combination often observed but never applied. It suits the indolence of those minds which never at-

tempt any thing, and which probably if they did attempt any thing, would not succeed, to refer to accident that which belongs to genius. It is sometimes said by such persons, that the discovery of the law of gravitation, was owing to accident; and a ridiculous story is told of the falling of an apple, as the cause of this discovery. As well might the invention of fluxions or the architectural wonders of the dome of St. Peter's, or the miracles of art, the St. John of Raphael or the Apollo Belvidere be supposed to be owing to accidental combinations. In the progress of an art, from its rudest to its most perfect state, the whole process depends upon experiments. Science is in fact nothing more than the refinement of common sense making use of facts already known to acquire new facts. Clays which are yellow are known to burn red; calcareous earth renders flint fusible,—the persons who have improved earthenware made their selections accordingly. Iron was discovered at least 1000-years before it was rendered malleable; and from what Herodotus says of this discovery, there can be little doubt that it was developed by a scientific worker in metals. Vitruvius tells us, that the ceruleum, a colour made of copper, which exists in perfection in all the old paintings of the Greeks and Romans and on the mummies of the Egyptians was discovered by an Egyptian king; there is therefore every reason to believe that it was not the result of accidental combination, but of experiments made for producing or improving colours. Amongst the ancient philosophers, many discoveries are attributed to Democritus and Anaxagoras; and, connected with chemical arts, the narrative of the inventions of Archimedes alone, by Plutarch, would seem to show how great is the effect of science in creating power. In modern times the refining of sugar, the preparation of nitre,

the manufacturing of acids, salts, &c. are all results of pure chemistry. Take gunpowder as a specimen; no person but a man infinitely diversifying his processes and guided by analogy, could have made such a discovery. Look into the books of the alchemists, and some idea may be formed of the effects of experiments. It is true, these persons were guided by false views, yet they made most useful researches; and Lord Bacon has justly compared them to the husbandman, who searching for an imaginary treasure, fertilized the soil. They might likewise be compared to persons who, looking for gold, discover the fragments of beautiful statues, which separately are of no value, and which appear of little value, to the persons who found them; but, which, when selected and put together by artists and their defective parts supplied, are found to be wonderfully perfect and worthy of conservation. Look to the progress of the arts, since they have been enlightened by a *system* of science, and observe with what rapidity they have advanced. Again, the steam-engine in its rudest form was the result of a chemical experiment; in its refined state, it required the combinations of all the most recondite principles of chemistry and mechanics, and that excellent philosopher who has given this wonderful instrument of power to civil society was led to the great improvements he made by the discoveries of a kindred genius on the heat absorbed when water becomes steam, and of the heat evolved when the steam becomes water. Even the most superficial observer must allow in this case a triumph of science, for what a wonderful impulse has this invention given to the progress of the arts and manufactures in our country, how much has it diminished labour, how much has it increased the real strength of the country! Acting, as it were with a

thousand hands, it has multiplied our active population ; and receiving its elements of activity from the bowels of the earth, it performs operations which formerly were painful, oppressive and unhealthy to the labourers, with regularity and constancy, and gives security and precision to the efforts of the manufacturer. And the inventions, connected with the steam-engine, at the same time that they have greatly diminished labour of body, have tended to increase power of mind and intellectual resources. Adam Smith well observes that manufacturers are always more ingenious than husbandmen ; and manufacturers who use machinery will probably always be found more ingenious than handicraft manufacturers. You spoke of porcelain as a result of accident ; the improvements invented in this country, as well as those made in Germany and France, have been entirely the result of chemical experiments ; the Dresden and the Sevres manufactories have been the work of men of science, and it was by multiplying his chemical researches that Wedgewood was enabled to produce at so cheap a rate those beautiful imitations, which while they surpass the ancient vases in solidity and perfection of material, equal them in elegance, variety and tasteful arrangement of their forms. In another department, the use of the electrical conductor, was a pure scientific combination, and the sublimity of the discovery of the American philosopher was only equalled by the happy application he immediately made of it. In our own times, it would be easy to point out numerous instances in which great improvements and beneficial results connected with the comforts, the happiness, and even life of our fellow creatures have been the results of scientific combinations ; but, I cannot do this, without constituting myself a judge of the works of philosophers who are still alive,

whose researches are known, whose labours are respected and who will receive from posterity praises that their contemporaries hardly dare to bestow upon them.

EUB.—We will allow that you have shown in many cases the utility of scientific investigations, as connected with the progress of the useful arts. But, in general, both the principles of chemistry are followed, and series of experiments performed without any view to utility; and, a great noise is made if a new metal or a new substance is discovered, or, if some abstracted law is made known relating to the phenomena of nature; yet, amongst the variety of new substances, few have been applied to any *trifling* use even, and the greater number have had no application at all; and, with respect to the general views of the science, it would be difficult to show that any real good had resulted from the discovery or extension of them. It does not add much to the dignity of a pursuit that those who have followed it for profit, have really been most useful; and that the mere artizan or chemical manufacturer has done more for society than the chemical philosopher. Besides, it has always appeared to me, that it is in the nature of this science to encourage mediocrity and to attach importance to insignificant things; very slight chemical labours seem to give persons a claim to the title of philosopher; to have dissolved a few grains of chalk in an acid, to have shown that a very useless stone contains certain known ingredients, or that the colouring matter of a flower is soluble in acid and not in alkali, is thought by some a foundation for chemical celebrity. I once began to attend a course of chemical lectures, and to read the journals containing the ephemeral productions of this science; I was dissatisfied with the nature of the evidence which the professor adopted in

his demonstrations, and disgusted with the series of observations and experiments which were brought forward one month to be overturned the next; in November, there was a Zingiberic acid which in January was shown to have no existence; one year there was a vegetable acid, which the next was shown to be the same as an acid known thirty years ago; to-day a man was celebrated for having discovered a new metal or a new alkali, and they flourished like the scenes in a new pantomime, only to disappear. Then, the great object of the hundred triflers in the science, appeared to be to destroy the reputation of the three or four great men whose labours were really useful and had in them something of dignity. And, there not being enough of trifling results or false experiments to fill up the pages of the monthly journals, the deficiency was supplied by some crude theories or speculations of unknown persons, or by some ill-judged censure or partial praise of the editor.

THE UNKNOWN.—I deny in toto the accuracy of what you are advancing. I have already shown that real philosophers, not labouring for profit, have done much by their own inventions for the useful arts; and, amongst the new substances discovered, many have had immediate and very important applications. The chlorine, or oxymuriatic gas of Scheele was scarcely known before it was applied by Berthollet to bleaching; scarcely was muriatic acid gas discovered by Priestley, when Guyton de Morveau used it for destroying contagion. Consider the varied and diversified applications of platinum, which has owed its existence as a useful metal entirely to the labours of an illustrious chemical philosopher; look at the beautiful yellow afforded by one of the new metals, chrome; consider the medical effects

of iodine, in some of the most painful and disgusting maladies* belonging to human nature, and remember how short a time investigations have been made for applying the new substances. Besides, the mechanical or chemical manufacturer has rarely discovered any thing; he has merely applied what the philosopher has made known, he has merely worked upon the materials furnished to him. We have no history of the manner in which iron was rendered malleable; but we know that platinum could only have been worked by a person of the most refined chemical resources, who made multiplied experiments upon it after the most ingenious and profound views. But, waving all common utility, all vulgar applications; there is something in knowing and understanding the operation of nature, some pleasure in contemplating the order and harmony of the arrangements belonging to the terrestrial system of things. There is no absolute utility in poetry; but it gives pleasure, refines and exalts the mind. Philosophic pursuits have likewise a noble and independent use of this kind; and there is a double reason offered for pursuing them, for, whilst in their sublime speculations they reach to the heavens, in their application they belong to the earth; whilst they exalt the intellect, they provide food for our common wants and likewise minister to the noblest appetites and most exalted views belonging to our nature. The results of this science are not like the temples of the ancients, in which statues of the gods were placed, where incense was offered and sacrifices were performed, and which were presented to the adoration of the multitude founded upon superstitious feelings; but, they are rather like the palaces of the moderns, to be admired and used, and where the

* Cancer and bronchocele.

statues, which in the ancients raised feelings of adoration and awe, now produce only feelings of pleasure and gratify a refined taste. It is surely a pure delight to know, how and by what processes this earth is clothed with verdure and life, how the clouds, mists and rain are formed, what causes all the changes of this terrestrial system of things, and by what divine laws order is preserved amidst apparent confusion. It is a sublime occupation to investigate the cause of the tempest and the volcano, and to point out their use in the economy of things,—to bring the lightning from the clouds and make it subservient to our experiments,—to produce as it were a microcosm in the laboratory of art, and to measure and weigh those invisible atoms, which, by their motions and changes according to laws impressed upon them by the Divine Intelligence, constitute the universe of things. The true chemical philosopher sees good in all the diversified forms of the external world. Whilst he investigates the operations of infinite power guided by infinite wisdom, all low prejudices, all mean superstitions disappear from his mind. He sees man an atom amidst atoms fixed upon a point in space; and yet modifying the laws that are around him by understanding them; and gaining, as it were, a kind of dominion over time, and an empire in material space, and exerting on a scale infinitely small a power seeming a sort of shadow or reflection of a creative energy, and which entitles him to the distinction of being made in the image of God and animated by a spark of the divine mind. Whilst chemical pursuits exalt the understanding, they do not depress the imagination or weaken genuine feelings; whilst they give the mind habits of accuracy, by obliging it to attend to facts, they likewise extend its analogies; and, though conversant with the

minute forms of things, they have for their ultimate end the great and magnificent objects of nature. They regard the formation of a crystal, the structure of a pebble, the nature of a clay or earth; and they apply to the causes of the diversity of our mountain chains, the appearances of the winds, thunder-storms, meteors, the earthquake, the volcano, and all those phenomena which offer the most striking images to the poet and the painter. They keep alive that inextinguishable thirst after knowledge, which is one of the greatest characteristics of our nature;—for every discovery opens a new field for investigation of facts, shows us the imperfection of our theories. It has justly been said, that the greater the circle of light, the greater the boundary of darkness by which it is surrounded. This strictly applies to chemical inquiries; and, hence they are wonderfully suited to the progressive nature of the human intellect, which by its increasing efforts to acquire a higher kind of wisdom, and a state in which truth is fully and brightly revealed, seems as it were to demonstrate its birthright to immortality.

EUB.—I am glad that our opposition has led you to so complete a vindication of your favourite science. I want no farther proof of its utility. I regret that I have not before made it a particular object of study.

PHIL.—As our friend has so fully convinced us of the importance of chemistry, I hope he will descend to some particulars as to its real nature, its objects, its instruments. I would willingly have a definition of chemistry, and some idea of the qualifications necessary to become a chemist, and of the apparatus essential for understanding what has been already done in the science, and for pursuing new inquiries.

THE UNKNOWN.—There is nothing more difficult

than a good definition, for it is scarcely possible to express, in a few words, the abstracted view of an infinite variety of facts. Dr. Black has defined chemistry to be, that science which treats of the changes produced in bodies, by motions of their ultimate particles or atoms; but this definition is hypothetical, for the ultimate particles or atoms are mere creations of the imagination. I will give you a definition, which will have the merit of novelty, and which is probably general in its application. *Chemistry relates to those operations by which the intimate nature of bodies is changed, or by which they acquire new properties.* This definition will not only apply to the effects of mixture, but to the phenomena of electricity, and, in short, to all the changes which do not merely depend upon the motion or division of masses of matter. However difficult it may have been to have given you a definition of chemistry, it is still more difficult to give you a detail of all the qualities necessary for a chemical philosopher. I will not name as many as Athenæus has named for a cook, who, he says, ought to be a mathematician, a theoretical musician, a natural philosopher, a natural historian, &c., though you had a disposition just now to make chemistry merely subservient to the uses of the *kitchen*. But I will seriously mention some of the studies fundamental to the higher departments of this science: a man may be a good practical chemist, perhaps, without possessing them; but he never can become a great chemical philosopher. The person who wishes to understand the higher departments of chemistry, or to pursue them in their most interesting relations to the economy of nature, ought to be well grounded in elementary mathematics; he will oftener have to refer to arithmetic than algebra; and to algebra than to geometry. But all these sciences lend

their aid to chemistry; arithmetic, in determining the proportions of analytical results, and the relative weights of the elements of bodies; algebra, in ascertaining the laws of the pressure of elastic fluids, the force of vapour, as dependent upon temperature, and the effects of masses and surfaces on the communication and radiation of heat; the applications of geometry are principally limited to the determination of the crystalline forms of bodies, which constitute the most important type of their nature, and often offer useful hints for analytical researches respecting their composition. The first principles of natural philosophy or general physics, ought not to be entirely unknown to the chemist. As the most active agents are fluids, elastic fluids, heat, light, and electricity, he ought to have a general knowledge of mechanics, hydronamics, pneumatics, optics, and electricity. Latin and Greek among the dead, and French among the modern languages, are necessary; and as the most important after French, German, and Italian. In natural history and in literature, what belongs to a liberal education, such as that of our universities, is all that is required; indeed, a young man who has performed the ordinary course of college studies, which are supposed fitted for common life and for refined society, has all the preliminary knowledge necessary to commence the study of chemistry. The apparatus essential to the modern chemical philosopher, is much less bulky and expensive, than that used by the ancients. An air-pump, an electrical machine, a voltaic battery (all of which may be upon a small scale,) a blow-pipe apparatus, a bellows and forge, a mercurial and water-gas apparatus, cups and basins of platinum and glass, and the common re-agents of chemistry, are what are required. All the implements absolutely ne-

cessary may be carried in a small trunk; and some of the best and most refined researches of modern chemists have been made by means of an apparatus, which might with ease be contained in a small travelling carriage, and the expense of which is only a few pounds. The facility with which chemical inquiries are carried on, and the simplicity of the apparatus, offer additional reasons, to those I have already given, for the pursuit of this science. It is not injurious to the health; the modern chemist is not like the ancient one, who passed the greater part of his time exposed to the heat and smoke of a furnace, and the unwholesome vapours of acids and alkalies, and other menstrea, of which, for a single experiment, he consumed several pounds. His processes may be carried on in the drawing-room; and some of them are no less beautiful in appearance, than satisfactory in their results. It was said by an author belonging to the last century, of alchemy, "that its beginning was deceit, its progress labour, and its end beggary." It may be said of modern chemistry, that its beginning is pleasure, its progress knowledge, and its objects truth and utility. I have spoken of the scientific attainments necessary for the chemical philosopher; I will say a few words of the intellectual qualities necessary for discovery, or for the advancement of the science. Amongst them patience, industry, and neatness in manipulation, and accuracy and minuteness in observing and registering the phenomena which occur, are essential. A steady hand and a quick eye are most useful auxiliaries; but there have been very few great chemists who have preserved these advantages through life; for the business of the laboratory is often a service of danger, and the elements, like the refractory spirits of romance, though the obedient slave of the magician, yet sometimes

escape the influence of his talisman, and endanger his person. Both the hands and eyes of others, however, may be sometimes advantageously made use of. By often repeating a process or an observation, the errors connected with hasty operations or imperfect views are annihilated; and, provided the assistant has no preconceived notions of his own, and is ignorant of the object of his employer in making the experiment, his simple and bare detail of facts will often be the best foundation for an opinion. With respect to the higher qualities of intellect necessary for understanding and developing the general laws of the science, the same talents I believe are required as for making advancement in every other department of human knowledge; I need not be very minute. The imagination must be active and brilliant in seeking analogies; yet entirely under the influence of the judgment in applying them. The memory must be extensive and profound; rather however calling up general views of things, than minute trains of thought;—the mind must not be like an encyclopedia, a burthen of knowledge, but rather a critical dictionary, which abounds in generalities, and points out where more minute information may be obtained. In detailing the results of experiments, and in giving them to the world, the chemical philosopher should adopt the simplest style and manner; he will avoid all ornaments, as something injurious to his subject, and should bear in mind the saying of the first King of Great Britain respecting a sermon which was excellent in doctrine, but overcharged with poetical allusions and figurative language, “that the tropes and metaphors of the speaker were like the brilliant wild flowers in a field of corn, very pretty, but which did very much hurt the corn.” In announcing even the greatest and most important

discoveries, the true philosopher will communicate his details with modesty and reserve; he will rather be a useful servant of the public, bringing forth a light from under his cloak when it is needed in darkness, than a charlatan exhibiting fireworks and having a trumpeter to announce their magnificence. I see you are smiling, and think what I am saying in bad taste; yet, notwithstanding, I will provoke your smiles still farther, by saying a word or two on his other moral qualities. That he should be humble-minded, you will readily allow, and a diligent searcher after truth; and neither diverted from this great object, by the love of transient glory or temporary popularity, looking rather to the opinion of ages, than to that of a day, and seeking to be remembered and named rather in the epochas of historians, than in the columns of newspaper writers or journalists. He should resemble the modern geometricians in the greatness of his views and the profoundness of his researches, and the ancient alchemists in industry and piety. I do not mean that he should affix written prayers and inscriptions of recommendations of his processes to Providence, as was the custom of Peter Wolfe, who was alive in my early days; but his mind should always be awake to devotional feeling, and in contemplating the variety and the beauty of the external world, and developing its scientific wonders, he will always refer to that infinite wisdom, through whose beneficence he is permitted to enjoy knowledge; and, in becoming wiser, he will become better,—he will rise at once in the scale of intellectual and moral existence, his increased sagacity will be subservient to a more exalted faith, and in proportion as the veil becomes thinner, through which he sees the causes of things, he will admire more the brightness of the divine light, by which they are rendered visible.

DIALOGUE THE SIXTH.

POLA, OR TIME.

DURING our stay in Illyria, I made an excursion by water with the Unknown, my preserver, now become my friend, and Eubathes, to Pola, in Istria. We entered the harbour of Pola in a *filucca*, when the sun was setting; and I know no scene more splendid than the amphitheatre seen from the sea in this light. It appears not as a building in ruins, but like a newly erected work; and the reflection of the colours of its brilliant marble and beautiful forms, seen upon the calm surface of the waters, gave to it a double effect, that of a glorious production of art, and of a magnificent picture. We examined with pleasure the remains of the arch of Augustus and the temple, very perfect monuments of imperial grandeur. But the splendid exterior of the amphitheatre was not in harmony with the bare and naked walls of the interior; there were none of those durable and grand seats of marble, such as adorn the amphitheatre of Verona;—from which it is probable, that the whole of the arena and conveniences for the spectators had been constructed of wood. Their total disappearance led us to reflect upon the causes of the destruction of so many of the works of the elder nations. I said, in our metaphysical abstractions, we refer the changes, the destruction of material forms, to *time*, but there must be physical laws in nature by which they are produced; and I begged our new friend to give us some ideas on this subject, in his character of chemical philosopher. If human science, I said, has discovered the principle of the decay of things, it is possible that human art may supply means

of conservation, and bestow immortality on some of the works which appear destined, by their perfection, for future ages.

THE UNKNOWN.—I shall willingly communicate to you my views of the operation of Time, philosophically considered. A great philosopher has said, man can in no other way command nature, but in obeying her laws; and, in these laws, the principle of change is a principle of life; without decay, there can be no reproduction; and, every thing belonging to the earth, whether in its primitive state, or modified by human hands, is submitted to certain and immutable laws of destruction, as permanent and universal as those which produce the planetary motions. The property, which, as far as our experience extends, universally belongs to matter, *gravitation*, is the first and most general cause of change in our terrestrial system; and, whilst it preserves the great mass of the globe in a uniform state, its influence is continually producing alterations upon the surface. The water, raised in vapour by the solar heat, is precipitated by the cool air in the atmosphere; it is carried down by gravitation to the surface, and gains its mechanical force from this law. Whatever is elevated above the superficies by the powers of vegetation, or animal life, or by the efforts of man, by gravitation, constantly tends to the common centre of attraction; and, the great reason of the duration of the pyramid, above all other forms, is, that it is most fitted to resist the force of gravitation. The arch, the pillar, and all perpendicular constructions, are liable to fall, when a degradation from chemical or mechanical causes takes place in their inferior parts. The forms upon the surface of the globe are preserved from the influence of gravitation by the attraction of cohesion, or by chemical attraction; but, if their

parts had freedom of motion, they would all be levelled by this power, gravitation, and the globe would appear as a plain and smooth oblate spheroid, flattened at the poles. The attraction of cohesion, or chemical attraction in its most energetic state, is not liable to be destroyed by gravitation: this power only assists the agencies of other causes of degradation; attraction, of whatever kind, tends, as it were, to produce rest, a sort of eternal sleep in nature. The great antagonist power is *heat*. By the influence of the sun, the globe is exposed to great varieties of temperature: an addition of heat expands bodies, and an abstraction of heat causes them to contract; by variation of heat, certain kinds of matter are rendered fluid, or elastic, and changes from fluids into solids, or from solids or fluids into elastic substances, and vice versâ, are produced; and all these phenomena are connected with alterations tending to the decay or destruction of bodies. It is not probable that the mere contraction or expansion of a solid, from the subtraction or addition of heat, tends to loosen its parts; but if water exists in these parts, then its expansion, either in becoming vapour or ice, tends not only to diminish their cohesion, but to break them into fragments. There is, you know, a very remarkable property of water, its expansion by cooling, and at the time of becoming ice, and this is a great cause of destruction in the northern climates; for where ice forms in the crevices or cavities of stones, or when water, which has penetrated into cement, freezes, its expansion acts with the force of the lever or the screw, in destroying or separating the parts of bodies. The mechanical powers of water, as rain, hail, or snow, in descending from the atmosphere, are not entirely without effect; for in acting upon the projections of solids, drops of water, or

particles of snow, and still more of hail, have a power of abrasion ; and a very soft substance, from its mass assisting gravitation, may break a much harder one. The glacier, by its motion, grinds into powder the surface of the granite rock, and the Alpine torrents that have their origin under glaciers, are always turbid, from the destruction of the rocks on which the glacier is formed. The effect of a torrent, in deepening its bed, will explain the mechanical agency of fluid water ; though this effect is infinitely increased, and sometimes almost entirely dependent upon the solid matters which are carried down by it. An angular fragment of stone, in the course of ages, moved in the cavity of a rock, makes a deep round excavation, and is worn itself into a spherical form. A torrent of rain flowing down the side of a building, carries with it the silicious dust, or sand, or matter which the wind has deposited there, and acts upon a scale infinitely more minute, but according to the same law. The buildings of ancient Rome have not only been liable to the constant operation of the rain courses, or minute torrents produced by rains, but even the Tiber, swollen with floods of the Sabine mountains and the Apennines, has often entered into the city, and a winter seldom passes away in which the area of the Pantheon has not been filled with water, and the reflection of the cupola seen in a smooth lake below. The monuments of Egypt are perhaps the most ancient and permanent of those belonging to the earth, and in that country rain is almost unknown. And all the causes of degradation connected with the agency of water act more in the temperate climates than in the hot ones, and most of all in those countries where the inequalities of temperature are greatest. The mechanical effects of air are principally in the action of winds in assisting the opera-

tion of gravitation, and in abrading by dust, sand, stones, and atmospheric water. These effects, unless it be in the case of a building blown down by a tempest, are imperceptible in days, or even years; yet a gentle current of air carrying the silicious sand of the desert, or the dust of a road for ages against the face of a structure, must ultimately tend to injure it, for with infinite or unlimited duration, an extremely small cause will produce a very great effect. The mechanical agency of electricity is very limited; the effects of lightning have, however, been witnessed, even in some of the great monuments of antiquity, the Colosseum at Rome, for instance; and only last year, in a violent thunderstorm, some of the marble, I have been informed, was struck from the top of one of the arches in this building, and a perpendicular rent made, of some feet in diameter. But the chemical effects of electricity, though excessively slow and gradual, yet are much more efficient in the great work of destruction. It is to the general chemical doctrines of the changes produced by this powerful agent that I must now direct your especial attention.

EUB.—Would not the consideration of the subject have been more distinct, and your explanations of the phenomena more simple, had you commenced by dividing the causes of change into mechanical and chemical,—if you had first considered them separately, and then their joint effects?

THE UNKNOWN.—The order I have adopted is not very remote from this. But I was perhaps wrong in treating first of the agency of gravitation, which owes almost all its powers to the operation of other causes. In consequence of your hint, I shall alter my plan a little, and consider first the chemical agency of water,

then that of air, and lastly that of electricity. In every species of chemical change, temperature is concerned. But unless the results of volcanos and earthquakes be directly referred to this power, it has no *chemical* effect in relation to the changes ascribed to time simply considered as heat, but its operations, which are the most important belonging to the terrestrial cycle of changes, are blended with, or bring into activity, those of other agents. One of the most distinct and destructive agencies of water depends upon its *solvent* powers, which are usually greatest when its temperature is highest. Water is capable of dissolving, in larger or smaller proportions, most compound bodies, and the calcareous and alkaline elements of stones are particularly liable to this kind of operation. When water holds in solution carbonic acid, which is always the case when it is precipitated from the atmosphere, its power of dissolving carbonate of lime is very much increased, and in the neighbourhood of great cities, where the atmosphere contains a large proportion of this principle, the solvent powers of rain upon the marble exposed to it must be greatest. Whoever examines the marble statues in the British Museum, which have been removed from the exterior of the Parthenon, will be convinced that they have suffered from this agency; and an effect distinct in the pure atmosphere and temperate climate of Athens, must be upon a higher scale in the vicinity of other great European cities, where the consumption of fuel produces carbonic acid in large quantities. Metallic substances, such as iron, copper, bronze, brass, tin and lead, whether they exist in stones, or are used for support or connexion in buildings, are liable to be corroded by water holding in solution the principles of

the atmosphere; and the rust and corrosion, which are made, poetically, qualities of time, depend upon the oxydating powers of water, which by supplying oxygen in a dissolved or condensed state, enables the metals to form new combinations. All the vegetable substances, exposed to water and air, are liable to decay, and even the vapour in the air attracted by wood, gradually reacts upon its fibres and assists decomposition, or enables its elements to take new arrangements. Hence it is that none of the roofs of ancient buildings more than 1000 years old remain, unless it be such as are constructed of stone, as those of the Pantheon of Rome and the tomb of Theodoric at Ravenna, the cupola of which is composed of a single block of marble. The pictures of the Greek masters, which were painted on the wood of the abies, or pine of the Mediterranean, as we are informed by Pliny, owed their destruction likewise, not to a change in the colours, not to the alteration of the calcareous ground on which they were painted, but to the decay of the tablets of wood on which the intonaco or stucco was laid. Amongst the substances employed in building, wood, iron, tin, and lead, are most liable to decay from the operation of water; then marble, when exposed to its influence in the fluid form; brass, copper, granite, sienite and porphyry are more durable. But, in stones, much depends upon the peculiar nature of their constituent parts; when the feldspar of the granite rocks contains little alkali or calcareous earth, it is a very permanent stone; but when, in granite, porphyry or sienite, either the feldspar contains much alkaline matter, or the mica, schorl or hornblende much protoxide of iron, the action of water containing oxygen and carbonic acid on the ferruginous elements tends to produce the disintegration of the stone. The red

granite, black sienite and red porphyry of Egypt, which are seen at Rome in obelisks, columns and sarcophagi, are amongst the most durable compound stones; but the grey granites of Corsica and Elba are extremely liable to undergo alteration,—the feldspar contains much alkaline matter, and the mica and schorl much protoxide of iron. A remarkable instance of the decay of granite may be seen in the hanging tower of Pisa; whilst the marble pillars in the basement remain scarcely altered, the granite ones have lost a considerable portion of their surface, which falls off continually in scales, and exhibits every where stains from the formation of peroxide of iron. The kaolin, or clay, used in most countries for the manufacture of fine porcelain or china, is generally produced from the feldspar of decomposing granite, in which the cause of decay is the dissolution and separation of the alkaline ingredients.

EUB.—I have seen serpentines, basalts and lavas which internally were dark, and which from their weight, I should suppose, must contain oxide of iron, superficially brown or red and decomposing. Undoubtedly this was from the action of water impregnated with air upon their ferruginous elements.

THE UNKNOWN.—You are perfectly right. There are few compound stones, possessing a considerable specific gravity, which are not liable to change from this cause; and oxide of iron amongst *the metallic substances anciently known*, is the most generally diffused in nature, and most concerned in the changes which take place on the surface of the globe. The chemical action of carbonic acid, is so much connected with that of water, that it is scarcely possible to speak of them separately, as must be evident from what I have before said: but the same action which is exerted by the acid

dissolved in water is likewise exerted by it in its elastic state, and in this case the facility with which the quantity is changed makes up for the difference of the degree of condensation. There is no reason to believe that the azote of the atmosphere has any considerable action in producing changes of the nature we are studying on the surface; the aqueous vapour, the oxygen and the carbonic acid gas, are, however, constantly in combined activity, and above all, the oxygen. And, whilst water, uniting its effects with those of carbonic acid, tends to disintegrate the parts of stones, the oxygen acts upon vegetable matter; and this great chemical agent is at once necessary, in all the processes of life and in all those of decay, in which nature, as it were, takes again to herself those instruments, organs and powers, which had for a while been borrowed and employed for the purpose or the wants of the living principle. Almost every thing effected by rapid combinations in combustion, may also be effected gradually by the slow absorption of oxygen; and though the productions of the animal and vegetable kingdom are much more submitted to the power of atmospheric agents than those of the mineral kingdom, yet, as in the instances which have just been mentioned, oxygen gradually destroys the equilibrium of the elements of stones, and tends to reduce into powder, to render fit for soils, even the hardest aggregates belonging to our globe. Electricity, as a chemical agent, may be considered, not only as directly producing an infinite variety of changes, but likewise as influencing almost all which take place. There are not two substances on the surface of the globe, that are not in different electrical relations to each other; and chemical attraction itself seems to be a peculiar form of the exhibition of

electrical attraction; and, wherever the atmosphere, or water, or any part of the surface of the earth gains accumulated electricity of a different kind from the contiguous surfaces, the tendency of this electricity is to produce new arrangements of the parts of these surfaces; thus, a positively electrical cloud, acting even at a great distance on a moistened stone, tends to attract its oxygenous or acidiform or acid ingredients, and, a negatively electrified cloud has the same effect upon its earthy, alkaline, or metallic matter; and the silent and slow operation of electricity is much more important in the economy of nature than its grand and impressive operation in lightning and thunder. The chemical agencies of water and air, are assisted by those of electricity; and their joint effects combined with those of gravitation and the mechanical ones I first described, are sufficient to account for the results of time. But, the physical powers of nature in producing decay, are assisted likewise by certain agencies or energies of organized beings. A polished surface of a building, or a statue, is no sooner made rough from the causes that have been mentioned, than the seeds of lichens and mosses, which are constantly floating in our atmosphere, make it a place of repose, grow and increase, and from their death, their decay and decomposition, carbonaceous matter is produced, and at length a soil is formed, in which grass can fix its roots. In the crevices of walls, where this soil is washed down, even the seeds of trees grow, and, gradually as a building becomes more ruined, ivy and other parasitical plants cover it. Even the animal creation lends its aid in the process of destruction, when man no longer labours for the conservation of his works. The fox burrows amongst ruins, bats and birds nestle in the cavities in walls, the snake and the

lizard likewise make them their habitation. Insects act upon a smaller scale, but by their united energies sometimes produce great effect; the ant, by establishing her colony and forming her magazines, often saps the foundations of the strongest buildings, and the most insignificant creatures triumph as it were over the grandest works of man. Add, to these sure and slow operations, the devastations of war, the effects of the destructive zeal of bigotry, the predatory fury of barbarians seeking for concealed wealth under the foundations of buildings, and tearing from them every metallic substance,—and it is rather to be wondered, that any of the works of the great nations of antiquity are still in existence.

PHIL.—Your view of the causes of devastation really is a melancholy one. Nor do I see any remedy; the most important causes will always operate. Yet, supposing the constant existence of a highly civilized people, the ravages of time might be repaired, and by defending the finest works of art from the external atmosphere, their changes would be scarcely perceptible.

EUB. — I doubt much, whether it is for the interests of a people, that its public works should be of a durable kind. One of the great causes of the decline of the Roman empire was, that the people of the republic and of the first empire left nothing for their posterity to do; aqueducts, temples, forums, every thing was supplied, and there were no objects to awaken activity, no necessity to stimulate their inventive faculties, and hardly any wants to call forth their industry.

THE UNKNOWN.—At least, you must allow the importance of preserving objects of the fine arts. Almost every thing we have worthy of admiration, is owing to what has been preserved from the Greek school; and

the nations, who have not possessed these works or models, have made little or no progress towards perfection. Nor does it seem that a mere imitation of nature is sufficient to produce the beautiful or perfect; but, the climate, the manners, customs and dress of the people, its genius and taste all co-operate. Such principles of conservation, as Philalethes has referred to, are obvious. No works of excellence ought to be exposed to the atmosphere; and it is a great object to preserve them in apartments of equable temperature and extremely dry. The roofs of magnificent buildings, should be of materials not likely to be dissolved by water, or changed by air. Many electrical conductors should be placed so as to prevent the slow or the rapid effects of atmospheric electricity. In painting, lapis lazuli, or coloured hard glasses in which the oxides are not liable to change, should be used, and should be laid on marble, or stucco incased in stone, and no animal or vegetable substances, except pure carbonaceous matter, should be used in the pigments, and none should be mixed with the varnishes.

EUB.—Yet, when all is done, that can be done, in the work of conservation, it is only producing a difference in the degree of duration. And from the statements that our friend has made, it is evident that none of the works of a mortal being can be eternal, as none of the combinations of a limited intellect can be infinite. The operations of nature, when slow, are no less sure; however man may, for a time, usurp dominion over her, she is certain of recovering her empire. He converts her rocks, her stones, her trees, into forms of palaces, houses and ships; he employs the metals found in the bosom of the earth as instruments of power, and the sands and clays which constitute its surface as orna-

ments and resources of luxury ; he imprisons air by water, and tortures water by fire to change or modify or destroy the natural forms of things. But, in some lustrums his works begin to change, and in a few centuries they decay and are in ruins ; and, his mighty temples, framed as it were for immortal and divine purposes, and his bridges formed of granite and ribbed with iron, and his walls for defence, and the splendid monuments by which he has endeavoured to give eternity even to his perishable remains, are gradually destroyed ; and these structures, which have resisted the waves of the ocean, the tempests of the sky, and the stroke of the lightning, shall yield to the operation of the dews of heaven, of frost, rain, vapour and imperceptible atmospheric influences ; and, as the worm devours the lineaments of his mortal beauty, so the lichens and the moss, and the most insignificant plants shall feed upon his columns and his pyramids, and the most humble and insignificant insects shall undermine and sap the foundations of his colossal works, and make their habitations amongst the ruins of his palaces, and the falling seats of his earthly glory.

PHIL.—Your history of the laws of the inevitable destruction of material forms, recalls to my memory our discussion at Adelsberg. The changes of the material universe are in harmony with those which belong to the human body, and which you suppose to be the frame or machinery of the sentient principle. May we not venture to imagine, that the visible and tangible world, with which we are acquainted by our sensations, bears the same relation to the divine and infinite Intelligence, that our organs bear to our mind ; — with this only difference, that in the changes of the divine system, there is no decay, there being in the order of things a perfect

unity, and all the powers springing from one will, and being a consequence of that will, are perfectly and unalterably balanced. Newton seemed to apprehend, that in the laws of the planetary motions, there was a principle which would ultimately be the cause of the destruction of the system. Laplace by pursuing and refining the principles of our great philosopher, has proved, that what appeared sources of disorder, are in fact the perfecting machinery of the system, and that the principle of conservation is as eternal as that of motion.

THE UNKNOWN.—I dare not offer any speculations on this grand and awful subject. We can hardly comprehend the cause of a simple atmospheric phenomenon, such as the fall of a heavy body from a meteor; we cannot even embrace in one view the millionth part of the objects surrounding us, and yet, we have the presumption to reason upon the infinite universe and the eternal mind by which it was created and is governed. On these subjects, I have no confidence in reason, I trust only to faith, and as far as we ought to inquire, we have no other guide but revelation.

PHIL.—I agree with you, that whenever we attempt metaphysical speculations we must begin with a foundation of faith. And, being sure from revelation, that God is omnipotent and omnipresent, it appears to me no improper use of our faculties, to trace even in the natural universe, the acts of his power and the results of his wisdom, and to draw parallels from the infinite to the finite mind. Remember, we are taught, that man was created in the image of God, and I think, it cannot be doubted, that in the progress of society, man has been made a great instrument by his energies and labours for improving the moral universe. Compare the

Greeks and Romans with the Assyrians and Babylonians, and the ancient Greeks and Romans with the nations of modern Christendom, and it cannot, I think, be questioned, that there has been a great superiority in the latter nations, and that their improvements have been subservient to a more exalted state of intellectual and religious existence. If this little globe has been so modified by its powerful and active inhabitants, I cannot help thinking, that in other systems, beings of a superior nature, under the influence of a divine will, may act nobler parts. We know from the sacred writings that there are intelligences of a higher nature than man, and I cannot help sometimes referring to my vision in the Colosseum, and in supposing some acts of power of those genii or seraphs similar to those which I have imagined in the higher planetary systems. There is much reason to infer, from astronomical observations, that great changes take place in the system of the fixed stars; Sir William Herschel, indeed, seems to have believed, that he saw nebulous or luminous matter in the process of forming suns; and there are some astronomers who believe that stars have been extinct; but, it is more probable that they have disappeared from peculiar motions. It is, perhaps, rather a poetical than a philosophical idea, yet I cannot help forming the opinion, that genii or seraphic intelligences may inhabit these systems, and may be the ministers of the eternal mind, in producing changes in them similar to those which have taken place on the earth. Time is almost a human word and change entirely a human idea; in the system of nature we should rather say progress than change. The sun appears to sink in the ocean in darkness, but it rises in another hemisphere; the ruins of a city fall, but they are often used to form more magni-

ficent structures, as at Rome ; but, even when they are destroyed, so as to produce only dust, nature asserts her empire over them, and the vegetable world rises in constant youth, and, in a period of annual successions, by the labours of man providing food, vitality and beauty upon the wrecks of monuments which were once raised for purposes of glory, but which are now applied to objects of utility.

DIALOGUE THE SEVENTH.

ON THE CHEMICAL ELEMENTS.*

SCENE—THE APENNINES ABOVE PERUGIA.

PHIL.—Notwithstanding the magnificence of the Alpine country and the beauty of the upper part of Italy, yet the scenery now before us has peculiar charms, dependent not only upon the variety and grandeur of the objects which it displays, but likewise upon its historical relations. The hills are all celebrated in the early history of Italy, and many of them are crowned by Etruscan towns. The lake of Thrasimene spreads its broad and calm mirror beneath a range of hills covered

* [The Dialogue of which this fragment was the commencement, according to the original plan of the author, was intended to have followed one on the doctrine of definite proportions, which was partly written, and from which an extract has been given in the fifth volume. For the sake of uniformity, the designations of the speakers, as used in the preceding pages, have been continued: in the original, others were employed; the Unknown stands for Philo-chemicus, and Philalethes for Poietes.]

with oak and chesnut; and the eminence where Hannibal marshalled that army which had nearly deprived Rome of empire, is now of a beautiful green from the rising corn. Here the Tiber runs a clear and bright blue mountain stream, meriting the epithet of *ceruleus* bestowed upon it by Virgil; and there the Chiusan marsh sends its tributary streams from the same level to the rivers of Etruria and Latium. In the extreme distance are the woods of the Sabine country, bright with the purple foliage of the Judah tree, extending along the sides of blue hills, which again are capped by snowy mountains. How rich and noble is the scene! How vast its extent! How diversified its colours!

EUB.—The profusion of the rich tree, which renders the woods of so bright a colour, perhaps gave origin to the expression *ver purpureum*.

THE UNKNOWN.—The epithet purple will apply with equal justice to the woods of Sabina and the plains of Umbria, where the sainfoin gives the predominating tint, and it is now in full and luxuriant blossom, and the banks of the Clitumnus are, as it were, lighted up by this brilliant colour.

EUB.—Nature in this view is probably nearly the same as it was 2000 years ago; but *how man is changed!*—improved in civilization, but enfeebled in character. How unlike the ancient Umbrians and Sabines are the people who inhabit these mountains and valleys!

THE UNKNOWN. — The reason is obvious enough. Man is formed by his institutions; and moral and political causes almost create his character; whereas *nature* is governed by fixed laws. The atmosphere, the mountains, the valleys, the plains, the degrees of heat and cold, with small differences, have continued the same;

and whether peopled or deserted, the soil will always produce fruits or flowers, wild or cultivated.

PHIL.—If the exterior of the globe is liable to small changes only, there must be a permanency in the elements of things; something must be unalterable. Will you give us some ideas respecting this part of your philosophy,—which are the true elements of things? If there be a permanency or constancy in the arrangements of nature, matter cannot be infinite either in its divisibility or changes: pray give us some light on these obscure and difficult matters.

THE UNKNOWN.—I shall willingly enter upon this subject. I cannot demonstrate to you what are the true elements of things; but I can exhibit to you those substances, which, as we cannot decompose them, are elementary for us: mathematically considered, it appears possible to prove the infinite divisibility of matter; but our mechanical means of division are extremely limited. There is every reason to believe that our powers of chemical decomposition are far from having reached their *ultimatum*; yet in the operations of nature, as well as in those of art, certain substances appear to be unchangeable; thus, if we take a metal, such as iron, and dissolve it in an acid, or sublime it in union with an elastic fluid, or make it enter into a hundred combinations, it may still be recovered unaltered in its properties, the same in substance and in quantity. The test of a body being indecomposable is, that in all chemical changes it increases in weight, or its changes result from its combining with new matter. Thus when mercury is converted into a red powder by being heated in the air, it gains in weight. The test of a body being compound is, that in assuming new forms it loses weight; thus, when the olive-coloured substance called oxide of silver is

converted into silver by heat, it weighs less than before ; but in all cases, either of gain or loss of weight, the circumstance depends either upon matter absorbed, or matter emitted, which is either solid, fluid, or aëriform, and which can be always collected and weighed. The metals, sulphur, phosphorus, carbon, silenium, iodine, brome, and certain elastic fluids are the only substances as far as our knowledge extends, which can be neither produced from other forms of matter, nor be converted into them. I explained to you on a former occasion that each of these substances enters into combinations in the same relative proportions, or in some multiple of those proportions ; and hence the idea has been entertained that they are minute indestructible particles, having always the same figure and weight. The weights of the smallest known relative proportions of the undecomposable bodies are these:—Hydrogen 1 ; chlorine 35·42 ; oxygen 8 ; fluorine 18·68 ; iodine 126·3 ; bromine 78·4 ; azote 14·15 ; sulphur 16·1 ; phosphorus 15·7 ; carbon 6·12 ; boron 10·9 ; selenium 39·6 ; silicium 7·5 ; aluminum 13·7 ; glucinum 17·7 ; ittrium 32·2 ; magnesium 12·7 ; zirconium 33·7 ; thorium 59·6 ; potassium 39·15 ; sodium 23·3 ; lithium 10 ; strontium 43·8 ; barium 68·7 ; calcium 20·5 ; manganese 27·7 ; zinc 32·3 ; iron 28 ; tin 58·9 ; arsenic 37·7 ; molybdenum 47·96 ; chromium 28 ; tungsten 94·8 ; columbium 185 ; antimony 64·6 ; uranium 217 ; cerium 46 ; cobalt 29·5 ; titanium 24·3 ; bismuth 71 ; copper 31·6 ; tellurium 32·3 ; cadmium 55·8 ; nickel 29·5 ; lead 103·6 ; mercury 202 ; osmium 99·7 ; silver 108 ; palladium 53·3 ; rhodium 52·2 ; gold 199·2 ; iridium 98·8 ; platinum 98·8.*

[* These numbers are taken from the table of equivalents of elementary substances formed by the late Dr Turner, and inserted in his

PHIL.—What is your idea of the cause of this difference of weight? Do you suppose their particles likewise of different sizes, or that they are of the same size, and have a different quantity of pores, or that their figures are different?

THE UNKNOWN. — These questions cannot be answered except by conjectures. At some time possibly we may be able to solve them by an hypothesis which will satisfactorily explain the chemical phenomena; but as we can never see the elementary particles of bodies, our reasoning upon them must be founded upon analogies derived from mechanics, and the idea that small indivisible particles follow the same laws of motion as the masses which they compose.

EUB.—I think it is contrary to the principles of sound philosophy to reason in this way. In mathematics it is always supposed that lines are composed from points, surfaces from lines, solids from surfaces; yet the elements bear no relation to their compounds. Again in light: according to your principle, white light would be composed of many particles of white light; whereas analysis proves it to be composed of various coloured particles, each differing from the other. On the hypothesis of Boscovitch, which is well explained in the *Institutio Physica* of Mako, matter, as well as I recollect, is supposed to be composed of indivisible points endowed with attraction and repulsion, which are assumed to be both physical and chemical elements.

Elements of Chemistry, the edition of 1834. The numbers 8 and 35.42 are given for oxygen and chlorine respectively, on the supposition, that water, and muriatic acid gas is each composed of one proportion of the constituent elements: should the view of the author be preferred, who, in his Elements of Chemical Philosophy, considered water as consisting of two proportions of hydrogen to one of oxygen and muriatic acid gas similarly constituted, all that is necessary is to multiply 8 and 35.42 by 2, and the numbers of all the other bodies accordingly.]

THE UNKNOWN.—You mistake me if you suppose I have adopted a system like the *Homooia* of Anaxagoras, and that I suppose the elements to be physical molecules endowed with the properties of the bodies we believe to be indecomposable. On the contrary, I neither suppose in them figure nor colour,—both would imply a power of reflecting light: I consider them, with Boscovitch, merely as points possessing weight and attractive and repulsive powers; and composing according to the circumstances of their arrangements either spherules or regular solids, and capable of assuming either one form or the other. All that is necessary for the doctrines of the corpuscular philosophy is to suppose the molecules which we are not able to decompose, spherical molecules; and that by the arrangement of spherical molecules regular solids are formed; and that the molecules have certain attractive and repulsive powers which correspond to negative and positive electricity. This is not mere supposition unsupported by experiments; there are various facts which give probability to the idea, which I shall now state to you. The *first fact* is, that all bodies are capable of being rendered fluid by a certain degree of heat, which supposes a freedom of motion in their particles that cannot be well explained except by supposing them spherical in the fluid state. The *second fact* is, that all bodies in becoming solid are capable of assuming regular polyhedral forms. The *third fact* is that all crystalline bodies present regular electrical poles. And the *fourth* is, that the elements of bodies are capable of being separated from each other by certain electrical attractions and repulsions.

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